Secondary Distribution Switchgear

FBX

SF6 Gas-insulated switchboards
CB function

Instructions
Installation - Commissioning
Operating - Maintenance

Schneider Electric

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1 Schneider Electric at your service

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Schneider Electric request the carefully reading of the following instructions in order to familiarize yourself with the product in this document before trying to install, operation, put into service or conduct the maintenance on it.

Our products are fully quality controlled and tested at the factory in accordance with the standards and regulations currently in force.

The correct functioning and lifespan of the product depend on respecting the installation, commissioning and exploitation instructions found in this manual. Not respecting these instructions is likely to invalidate any guarantee.

Local safety requirements which are in accordance with these instructions, especially those regarding the safety of product operators and other site workers, must be observed.

Schneider Electric declines any responsibility for the following points:
- the non respect of the recommendations in this manual which make reference to the international regulations in force.
- the non respect of the instructions by the suppliers of cables and connection accessories during installation and fitting operations,
- possible aggressive climatic conditions (humidity, pollution, etc.) acting in the immediate environment of the materials that are neither suitably adapted nor protected for these effects.

1.1 Particular instructions for operations and interventions

This user manual does not list the locking-out procedures that must be applied. The interventions described are carried out on de-energized equipment (in the course of being installed) or locked out (non operational).

Whilst commissioning and operating the product all general safety instructions for electrical applications (protective gloves, insulating stool, etc.) must be respected, this in addition to the standard operating instructions.

All operations must be completed once started.

The durations (for completing the operations mentioned) given in the maintenance tables are purely an indication and depend on on-site conditions.

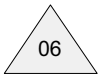
1.2 Protection equipments

Only qualified and accredited people can operate on our products. They must be equipped with all the correct protective equipment required for the task being performed.

A qualified person is one who has the skills and knowledge related to the construction, installation and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Except when it is imposed, the wearing of the gloves has been voluntarily limited in this manual so as to have clear visuals of the hands and operations described.

1.3 Symbols of information



Code for a product recommended and marketed by Schneider Electric

Tightening torque value
Example: 21 Nm

Mark corresponding to a key

1.4 Symbols and important safety informations

The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

1.5 Contacts

Group Schneider Electric service centers are there for:

- Engineering and technical assistance
- Commissioning
- Training
- Preventive and corrective maintenance
- Spare parts
- Adaptation work

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35 rue Joseph Monier - CS 30323

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2 With regards to this User Manual

2.1 Reminder concerning normal service conditions (in accordance with the IEC62271-1 standard)

* Permissible ambient temperature

The ambient air temperature should be comprised between - 5° C (on option -15 or -25°C) and + 40° C.

The mean measured value for a 24 hour period must not exceed 35°C.

* Installation altitude

Items of HV equipment are defined in accordance with IEC Standards and can be used up to an altitude of 1000 m.

Above this, you may have to take into account the reduced atmospheric pressure.

For these specific cases, contact the Schneider Electric Sales Department

* Atmospheric pollution

The ambient air must not contain any dust particles, fumes or smoke, corrosive or flammable gases, vapours or salts.

* Permissible atmospheric humidity level

The average atmospheric relative humidity level measured over a 24-hour period must not exceed 95%.

The average water vapour pressure over a period of 24 hours must not exceed 22 mbar.

The average atmospheric relative humidity value measured over a period of one month must not exceed 90 %.

The average water vapour pressure over a period of one month must not exceed 18 mbar.

Condensation may appear in case of any sharp variation in temperature, due to excessive ventilation, a high atmospheric humidity level or the presence of hot air. This condensation can be avoided by an appropriate lay-out of the room or of the building (suitably adapted ventilation, air driers, heating etc.).

Whenever the humidity level is higher than 95 %, we recommend that you take appropriate corrective measures. For any assistance or advice, contact the Schneider Electric After-Sales department.

2.2 Other technical notices to be consulted

For all operations relating to the installation and use of the switchboard, see the manuals listed below.

■ AMTNoT110-02	FBX	Guide to Civil Engineering Work	
■ AMTNoT131-02	FBX	Installation - Commissioning	
■ AMTNoT132-02	FBX	Operation - Maintenance	
■ AMTNoT153-02	FBX	Mechanical key-type interlocking	Assembly - Operation

2.3 Tools *(not supplied)* required for the operations described in this user manual

- Crowbar
- Scissors
- Open-ended spanners sizes 8, 10 and 13
- 2 x open-ended spanners - size 7
- Allen key - sizes 2.5, 3, 4 and 5 mm
- Box spanner - size 7
- Ratchet handle + extension with socket sizes 8, 10, 13 and 16 mm
- Torque wrench
- Cutting pliers

2.4 Tightening torque values [Nm] for standard assemblies (nut + bolt)

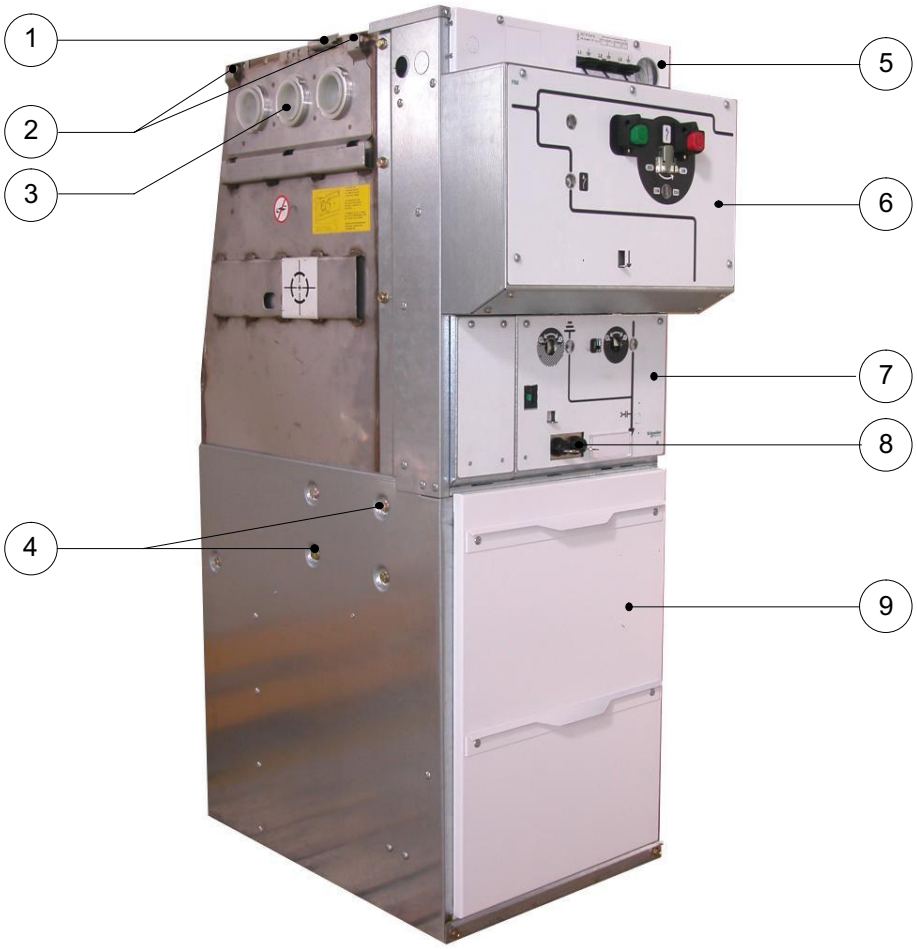
Diameter	Plastic (PA 6.6)	Steel Class < 8.8	Steel Class ≥ 8.8 ≤ 10.9	Threaded fasteners with grease A2-70
M 6	0.8	4.3	8.8	6.6
M 8	1.8	10.5	21.0	15.8
M 10	3.5	14.0	42.0	35.0
M 12	6.0	-	70.0	60.0
M 16	12.0	-	170.0	134.0

3 Presentation of the 630 A CB Functional Unit

This manual only covers the 630 A CB Function. It is complementary to the General Manual AMTNoT131 (See Section 2.2).

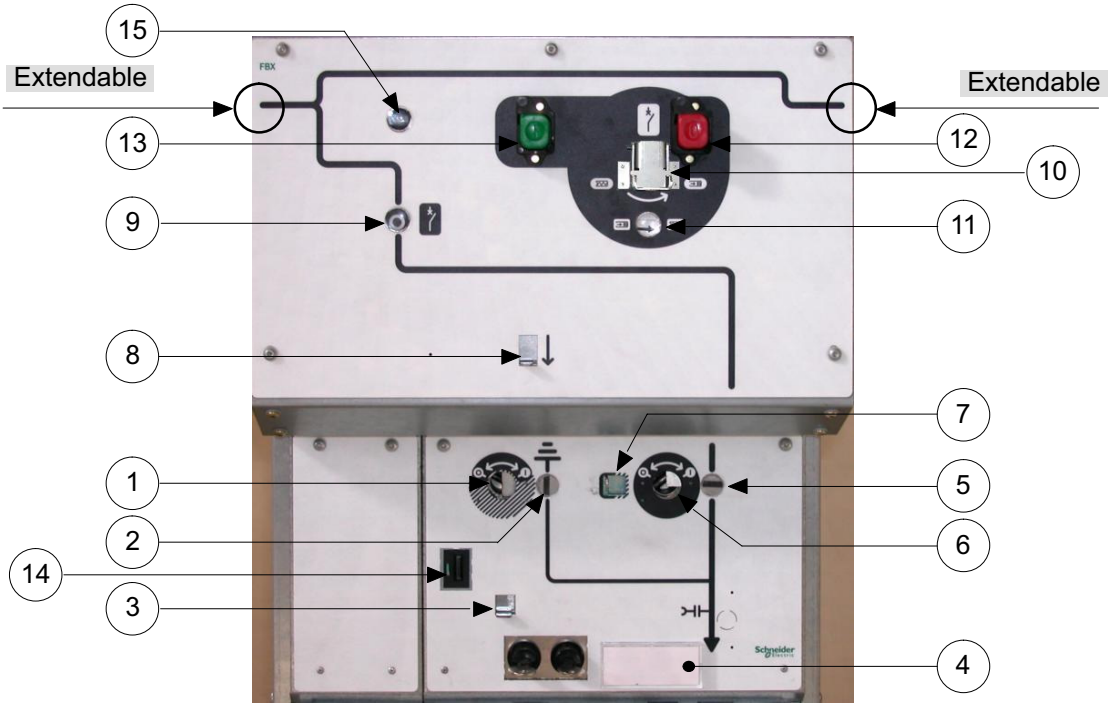
The 630 A CB Functional Unit is fitted with a C150 mechanical control mechanism.

3.1 Presentation of the CB Functional Unit's mimic diagram



Key

- *1 Lifting ring*
- *2 Function-Top Coupling*
- *3 Busbar connector*
- *4 Lower function coupling points*
- *5 Voltage presence indicator light and low voltage compartment panel*
- *6 Protective cover for the C150 mechanical control mechanism*
- *7 Access panel for the disconnecter switch mechanical control mechanism*
- *8 Interlocking by locks*
- *9 Cable compartment cover*



Key

- *1 Lever socket for the earthing switch*
- *2 Earthing switch position indicator*
- *3 Cable compartment cover latch*
- *4 Descriptive plate*
- *5 Disconnector position indicator*
- *6 Lever socket for the disconnector*
- *7 Interlock between disconnector and earthing switches*
- *8 Interlock between disconnnector and circuit breaker*
- *9 Circuit breaker position indicator*
- *10 Lever socket for the circuit breaker*
- *11 "Primed-released" indicator light showing position of the spring*
- *12 Push button for tripping*
- *13 Push button for closing*
- *14 Fault indicator (optional)*
- *15 Operating counter*

3.2 Locking-out by padlock *(not supplied)*

■ Locking-out using circuit-breaker operations.

■ Locking-out using the red trip button.

■ Locking-out using the green closure button.

4 Packaging - Storage - Unpacking - Handling

4.1 Packaging - Storage

See the instructions in manual AMTNoT131-02 (See § 2.2).

4.2 Unpacking

See the instructions in manual AMTNoT131-02 (See § 2.2).

4.3 Handling

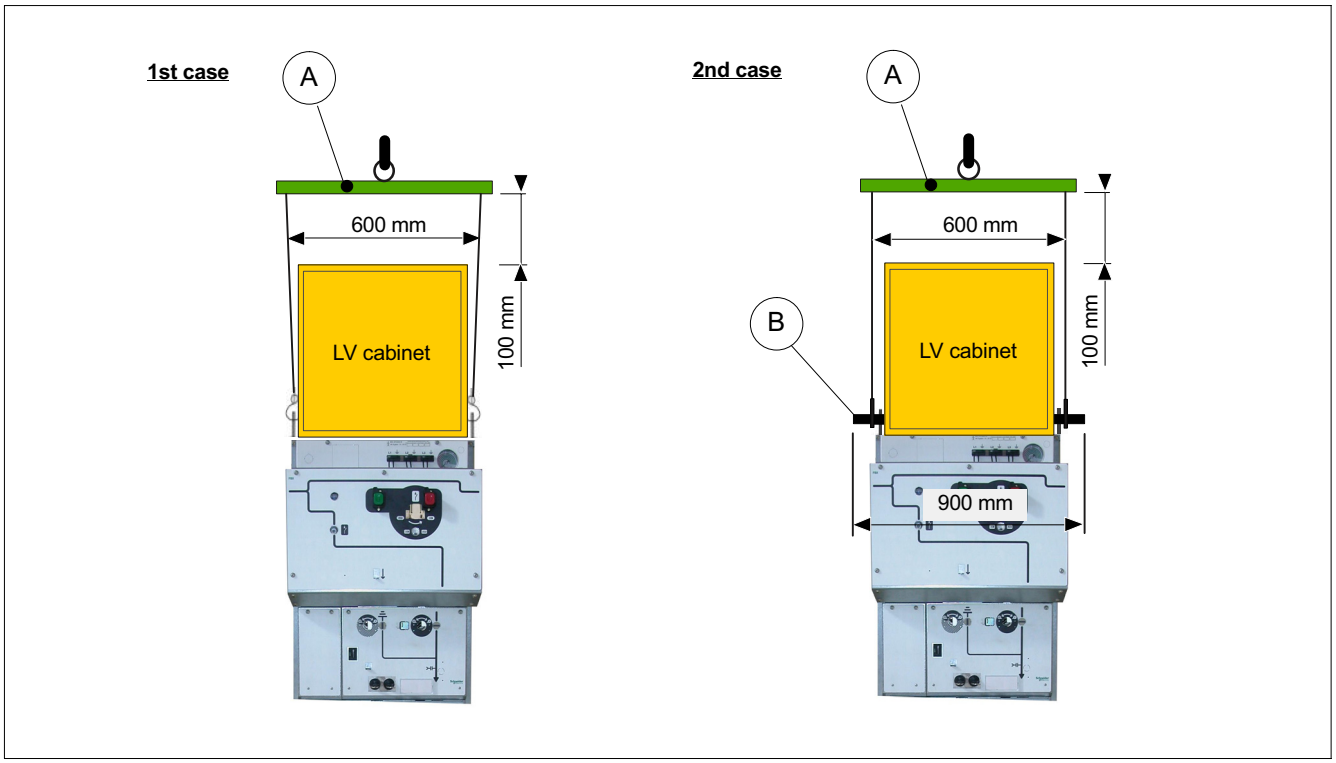
See the instructions in manual AMTNoT137-02 (See § 2.2) displayed on the circuit-breaker protective blanket.

NOTICE

When the CB unit is fitted with an LV cabinet on its roof, use a yoke (A) (see below).

NOTICE

In the second case, attach a metal ring (B), diameter 25 mm (min.), to the lifting lugs.



5 Installation - Fixing - Connection of the HV cables

5.1 Installation and fixing to the floor

Assemble the switchboard before fixing down to the floor.

See the instructions in manual AMTNoT131-02 (See § 2.2).

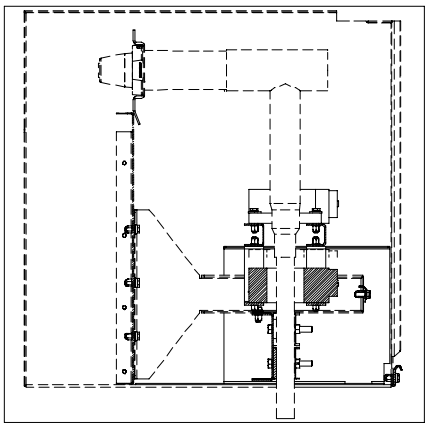
5.2 Earthing

See the instructions in manual AMTNoT131-02 (See § 2.2).

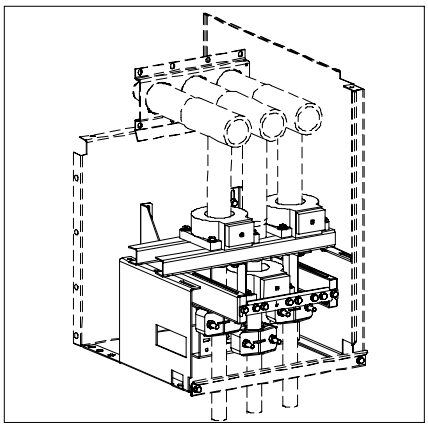
5.3 Cable connections

For all connectivity operations, see the instructions in manual AMTNoT131-02 (See § 2.2).

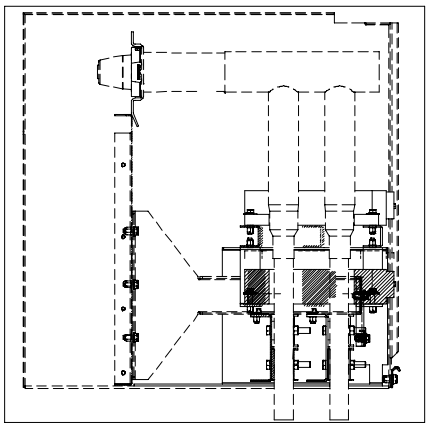
5.4 Fitting of a metering core on one or two cables per phase (optional)



- The fitting of the core must be completed at the same time as the connections to the withdrawable plugs.
- The tightening of the fixings is completed after the plugs are connected.

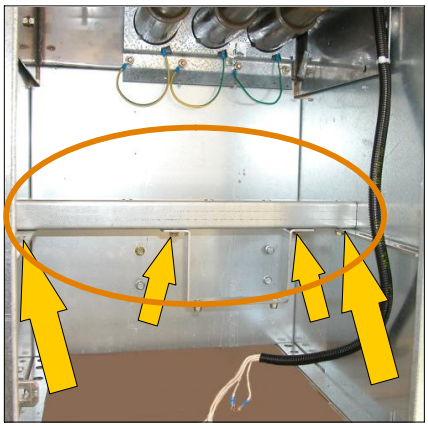


- Phase L2: The core is fitted below the two others.



- Installation of a core, with 2 cables per phase.

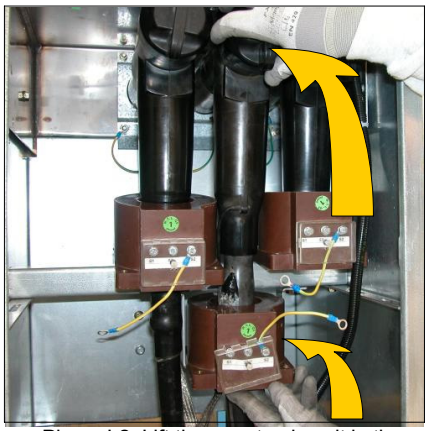
5.5 Example of cable connections with a single core per phase



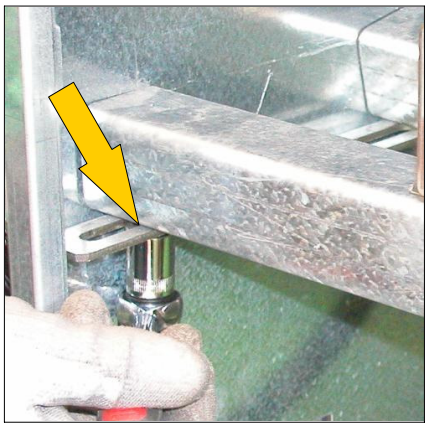
- Fit the rear crossmember core mounting (with rear cradle) to hold the central core in place.
- Screw in, but do not tighten, the 4 screws.

- Pass the HVA cables through the opening in the cable run.
- Fit the cores onto the cables, making sure they are the right way round.
- Put together the plug-in connectors.

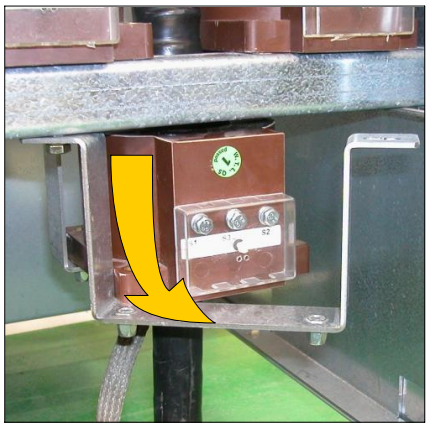
- Phases L1 and L3: Lift the core to place it above the rear crossmember whilst attaching the socket to the crossmember.



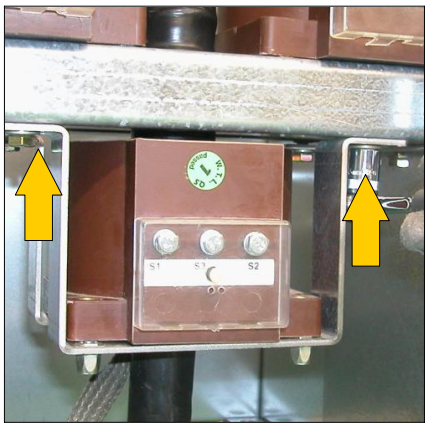
- Phase L2: Lift the core to place it in the rear cradle whilst attaching the socket to the crossmember.
- Position the front crossmember.



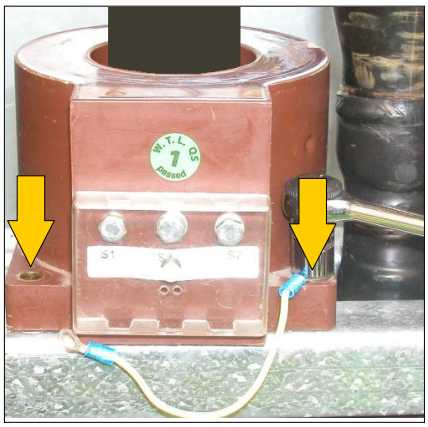
- Attach the front crossmember using 2 screws without tightening them.



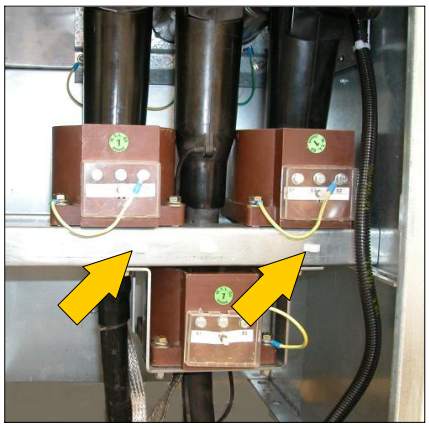
- Refit the front cradle for the Phase L2 core.



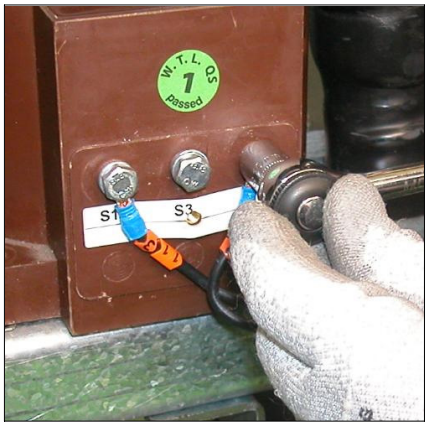
- Tighten the 2 screws on the front cradle.



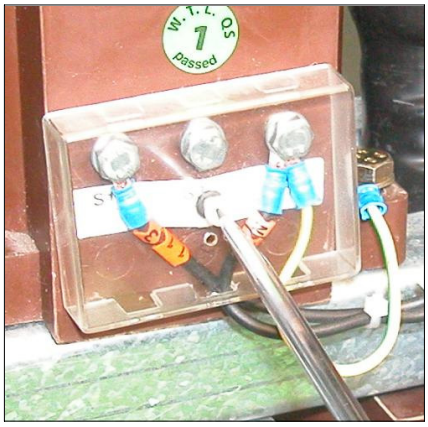
- Attach all cores (4 screws per unit).
- Attach the earthing wire using the front right hand side mounting screw.



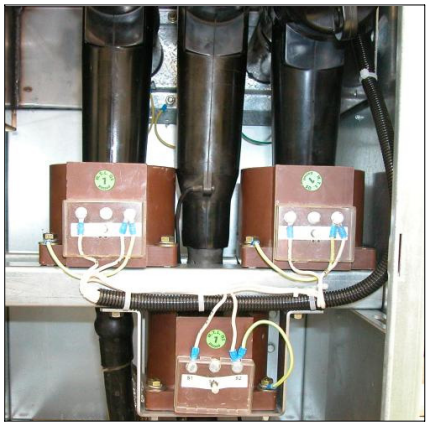
- The three cores are shown in place.
- Attach the LV loom in two places along the centre of the front cross member.



- Remove the protective cover.
- Connect the secondary core circuits as per the identification marks and diagrams.



- Refit the protective cover.



- Tighten all fixing bolts.
- Attach the cables using Rilsan cable ties.

NOTICE

Complete connection by clamping the cables (See the corresponding manual § 2.2).

6 Mechanical interlocks

6.1 Functional mechanical interlocks

The CB function is equipped with internal mechanical interlocks, called ”functional”, intended to avoid any kind of operating error.

It is necessary to know these interlocks in order to operate the switchgear correctly.

	Position	Circuit breaker	Disconnector switch	Earthing switch	Access cover to cable compartment
Circuit breaker	Closed	-	Locked (closed or open)	Locked open	Locked closed
	Open	-	Free	Dependant on the position of the disconnector switch	Dependant on the position of the earthing switch
Disconnector switch	Closed	Free	-	Locked open	Locked closed
	Open	Free (Normally Open)	-	Free	Dependant on the position of the earthing switch
Earthing switch	Closed	Free (Normally Open)	Locked open	-	Free
	Open	Free (Normally Open)	Dependant on the position of the circuit breaker	-	Locked closed
Access panel to the cable compartment	Open	Free (Normally Open)	Locked open	Locked Closed	-

6.2 ”Operating” interlocks by locks

Use of HV/LV/Transformer non-return interlocking on a CB function

Commissioning

- Earthing Switch is already locked ‘open’ with key 1.
- Recover Key 1.
- Go to the low voltage circuit breaker, introduce Key 1 into the CB lock and unlock it immediately.
- Plug in then close the LV circuit breaker.
- Return to the Functional Unit.
- Close the line isolator.
- Re-arm and trip the circuit breaker.

De-energizing

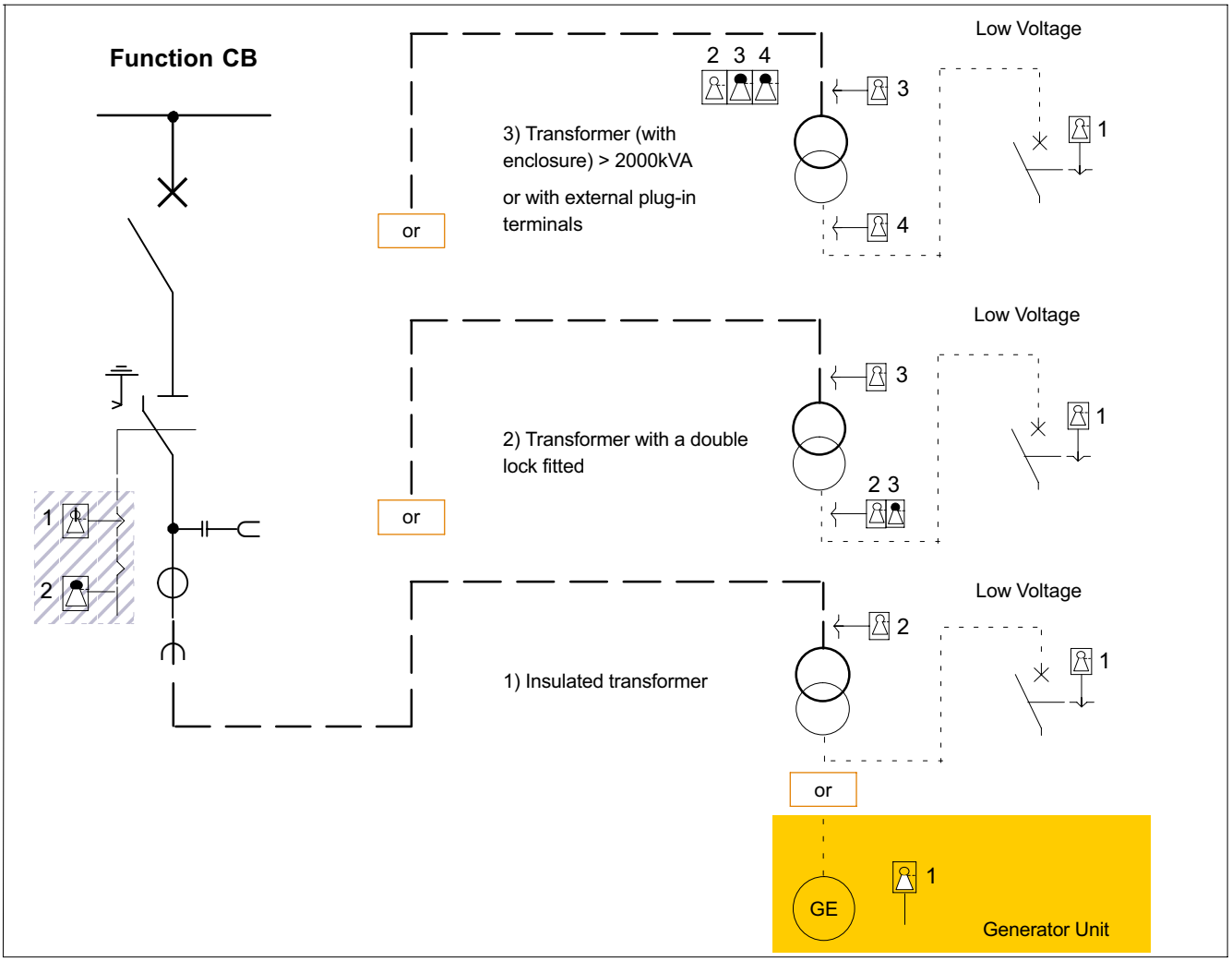
- Trip the circuit breaker.
- Open the line isolator.
- Go to the LV switchboard, open and unplug the master circuit breaker.
- Lock this circuit breaker in its ‘withdrawn’ position using Key 1.
- Recover key 1 and go back to function CB.
- Introduce Key 1 into the earthing switch lock and unlock it immediately.
- Check that there is no voltage across the voltage indicator units.
- Close the earthing switch.
- Lock earthing switch using Key 2.
- Go to the transformer.

1st case, insulated transformer:
- unlock transformer access (or plug-in terminals) using Key 2.

2nd case, transformer with a double lock fitting:
- unlock transformer access with key 2,
- recover key 3 to unlock the plug-in terminals.

3rd case, transformer (with metal-clad enclosure), > 2000kVA or with external plug-in terminals:
- introduce key 2 into the transfer lock,
- recover key 3 to gain access to the transformer,
- recover key 4 to gain access to the transformer or the plug-in terminals.

Representation of lock-type interlocks



Installation of lock-type interlocks

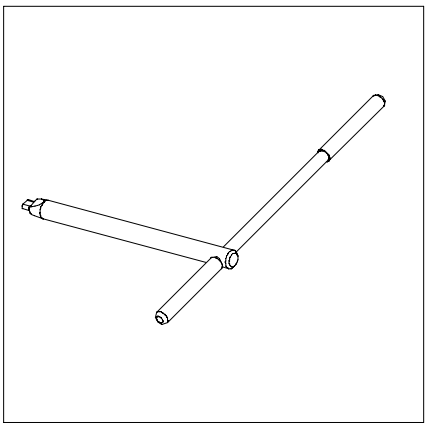
See the instructions in manual AMTNoT153-02 (See § 2.2).

7 Use of the CB function

7.1 Operating accessories

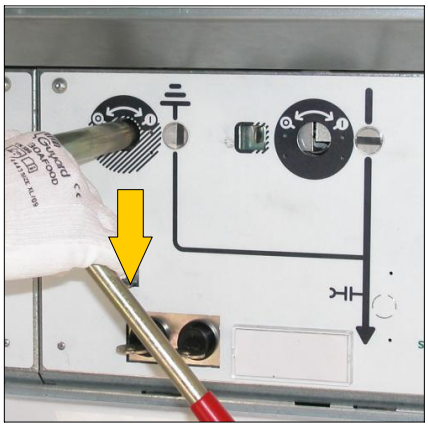
- Standard operating lever for the earthing switch (red end).

- Standard operating lever for the load-break switch (black end).



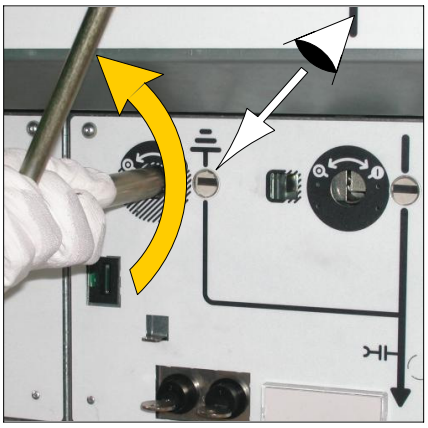
- Circuit breaker operating lever.

7.2 Opening the earthing switch



- Check that the tag is fully lowered.
- Insert the appropriate lever (red end) into the earthing switch socket.

- Grasp the lever with both hands.



- Lift the lever: the earthing switch is now in the open position.
- Remove the lever.

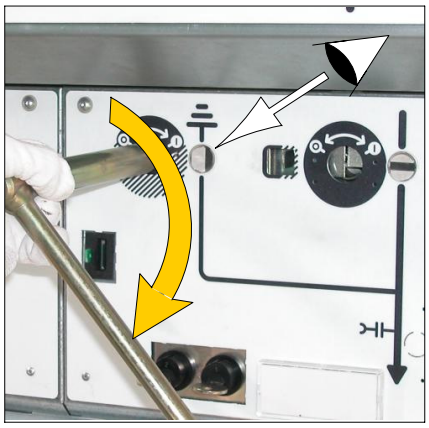
7.3 Closing the earthing switch

NOTICE

Before closing the earthing switch, ensure there is no voltage across the indicator units (see corresponding manual - § 2.2).

- Hold the locking tab open to the right.
- Insert the appropriate lever (red end) into the earthing switch socket.

- Grasp the lever with both hands.

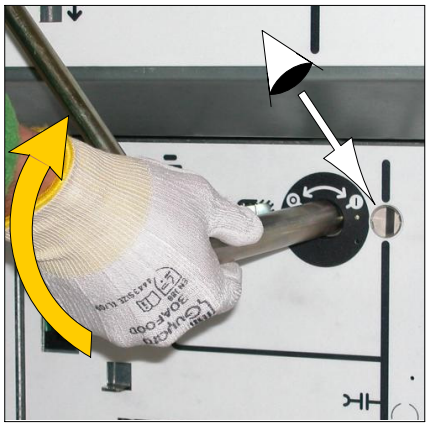


- Pull the lever down: the earthing switch is closed.
- Remove the lever.

7.4 Closing the line isolating switch [earthing switch open - circuit breaker tripped]

- Lift the locking tab.
- Insert the lever (black end) into the disconnector switch socket.

- Grasp the lever with both hands.

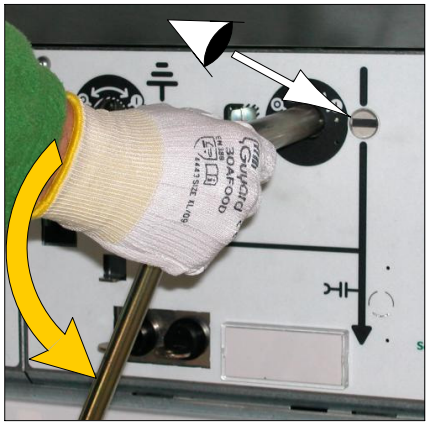


- Lift the lever: The line isolator is now closed.
- Remove the lever.

7.5 Opening the line isolating switch [circuit breaker tripped]

- Lift the locking tab.
- Insert the lever (black end) into the disconnector switch socket.

- Grasp the lever with both hands.



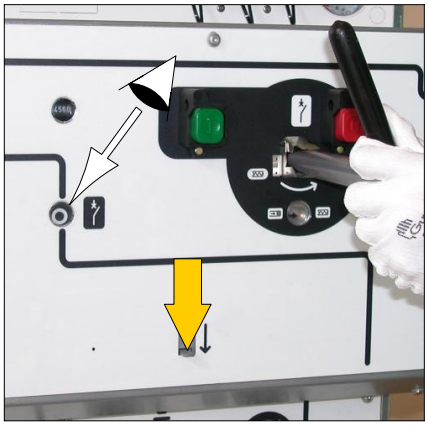
- Pull the lever down: The line isolator is now open.
- Remove the lever.

7.6 Closing the circuit breaker [Line Isolator closed]

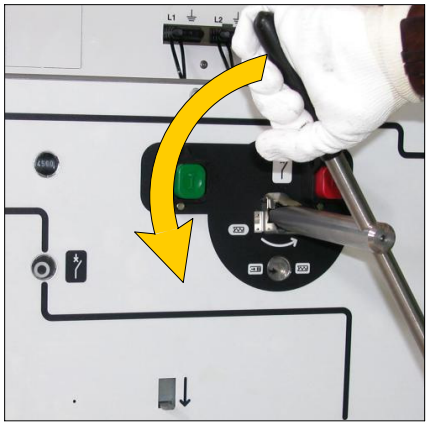
NOTICE

Under normal operating conditions, CB manoeuvres are carried out with the line isolator closed.

However, CB test manoeuvres are possible with the line isolator open.



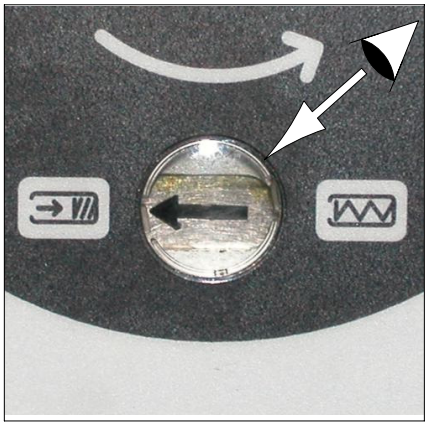
- Circuit breaker open: make sure that the tag is fully lowered.
- Lift the tab and insert the lever into the re-arming spring's switch hub.



- Turn the lever to the left to re-arm the CB closing spring (rotate through approx. 350°).

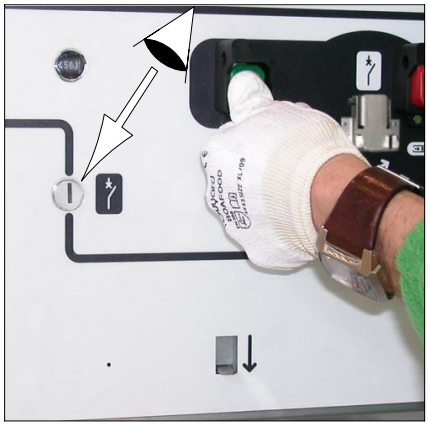
CAUTION

Do not force the lever at the end of the operating!



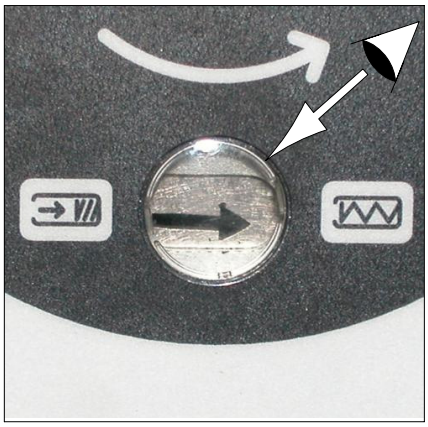
- The indicator will show that the spring is 'armed'.

- Press the (green) 'I' button.

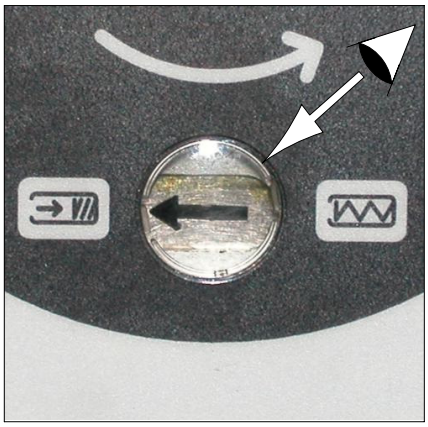


- The circuit breaker is now closed.
- The CB closing spring is 'unarmed'.

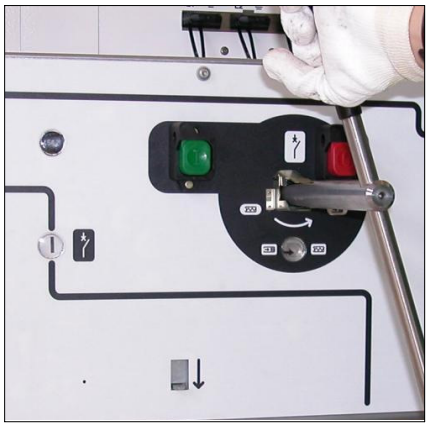
7.7 Re-arming the CB closing spring [CB closed]



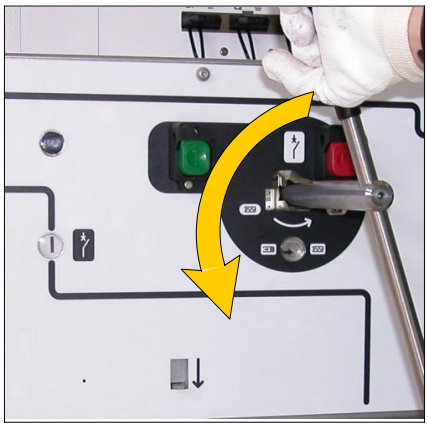
- The closing spring is 'unarmed'.



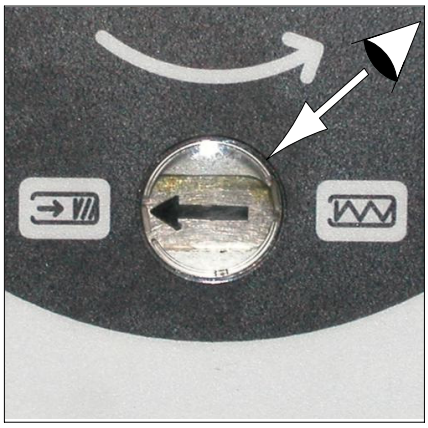
- For motorised controls, the CB closing spring is re-armed as soon as the CB is closed.



- For manual controls, you must manually re-arm the CB closing spring.
- Lift the tab and insert the lever into the re-arming spring's switch hub.



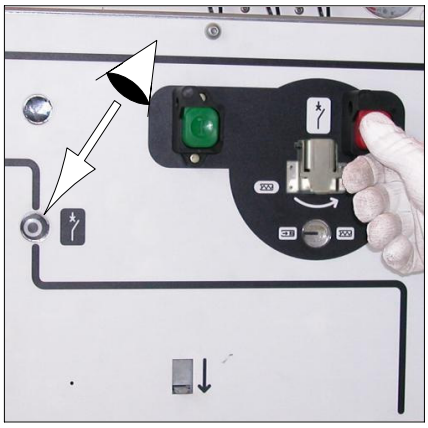
■ Turn the lever to the left to re-arm the CB closing spring (rotate through approx. 350°).



■ The indicator will show that the spring is 'armed' even though the CB is closed.

7.8 Opening the circuit breaker [Line Isolator closed]

■ Press the (red) 'O' button.



■ The circuit breaker is now open.

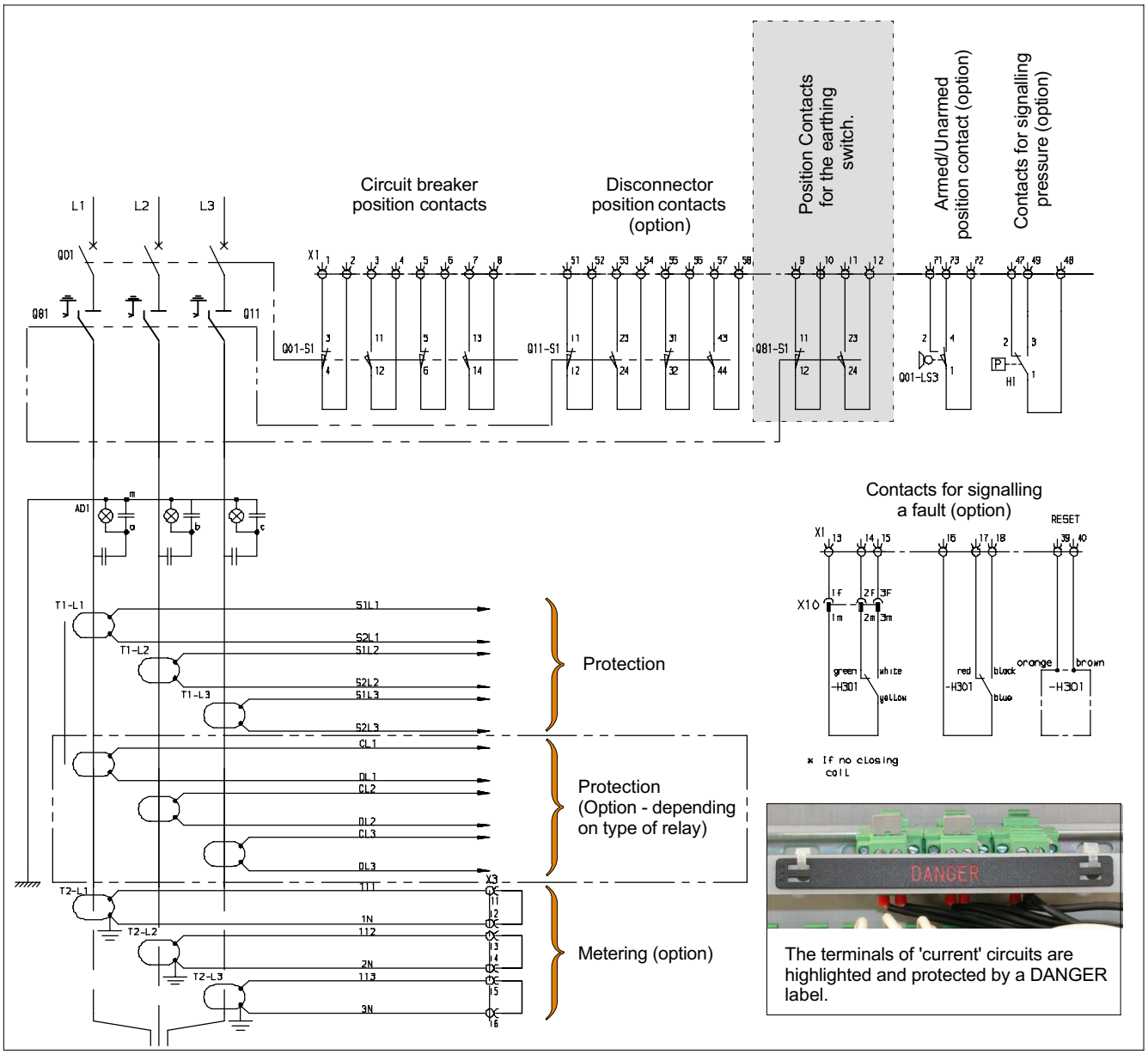
8 CB Function diagram

Key

Q01: Circuit breaker
Q01-F11, Q01-F12: Tripping coils
-YU: Undervoltage tripping coil
Q01-F14: Closing coil
Q01-F31: Striker pin
Q01-LS1 to LS3: Spring position contacts
Q01-S1: Circuit breaker position contact
Q01-S52: Lever insertion locking contact
Q01-S53, Q01-S54: Motor interlock contacts
Q11: Disconnector
Q11-S1: Disconnector position contact
Q11-S51: Closing interlock contact
Q81-S1: Earthing switch position contact

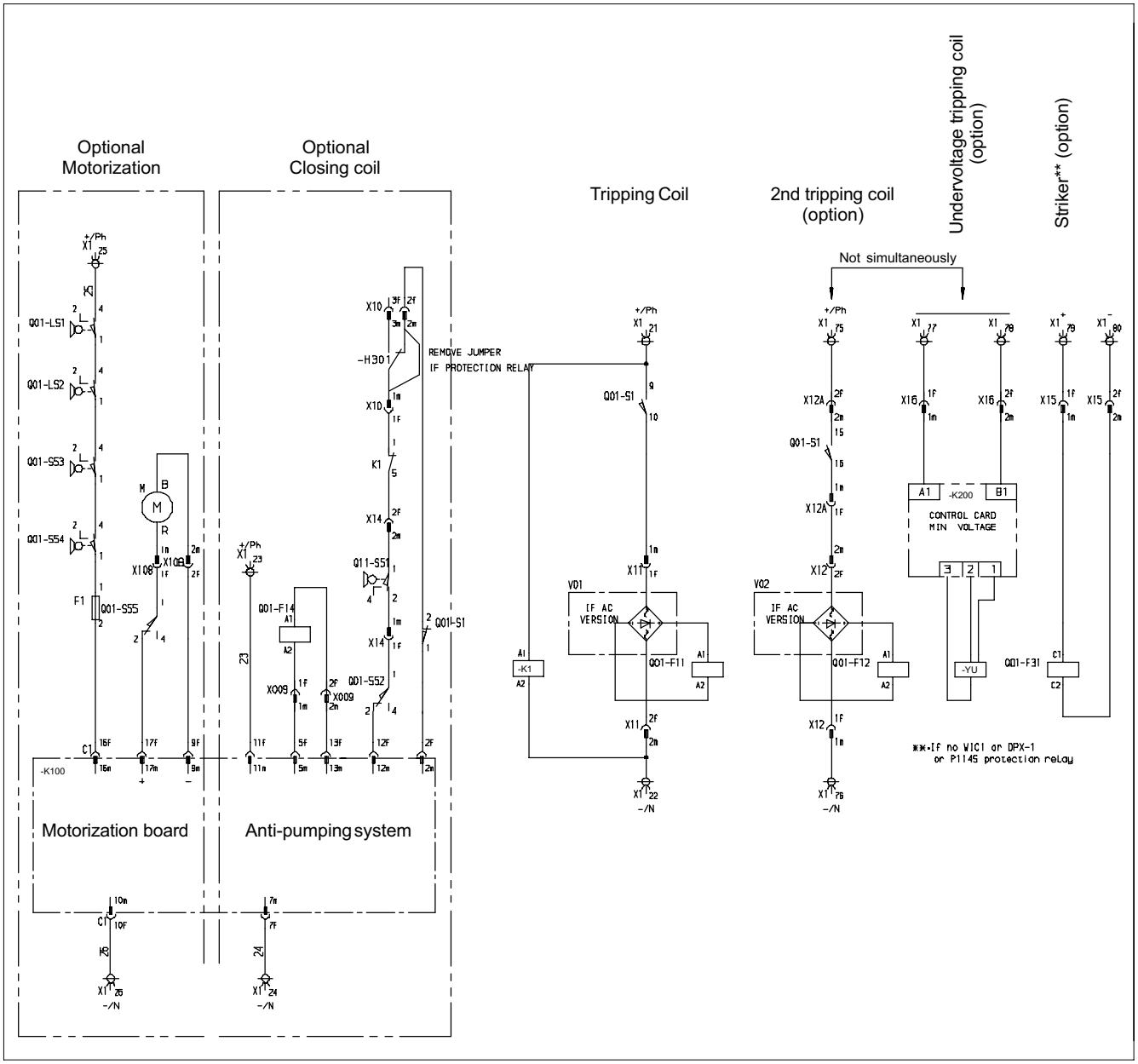
-H1: 'Pressure' indictor contact
-H301: 'Fault' indicator contact
-K100: Anti-pumping board
-K200: Electronic undervoltage trip unit
-K1: Instantaneous auxiliary relays
-C1: Connector
-F1: Fuse
-M: Motor
V01, V02: Bridge rectifiers
X1, X3: Test terminal box
X009, X108, X11, X12, X12A: Connectors
X10, X14, X15, X16: Connectors

8.1 ”Metering - Protection - Signalling” section



The terminals of 'current' circuits are highlighted and protected by a DANGER label.

'Control' section



8.2 LV Fuse board (SCHURTER, 5x20)

Voltage	Fuse calibre	Reference (Schurter)
230VAC	800mA	FST 0034.3116
220VDC	1A	FST 0034.3117
125VAC	1.6A	FST 0034.3119
125VDC		
110VAC	2A	FST 0034.3120
110VDC		
60VDC	4A	FST 0034.3123
48VDC	5A	FST 0034.3124
24VDC	8A	FST 0034.3126

9 WIC1 or DPX-1 protection relays (option)

9.1 Configuring the protection relays

NOTICE

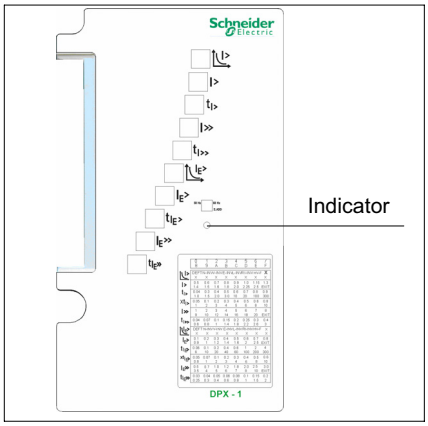
The relays are supplied pre-configured, with a default setting of their maximum levels.

NOTICE

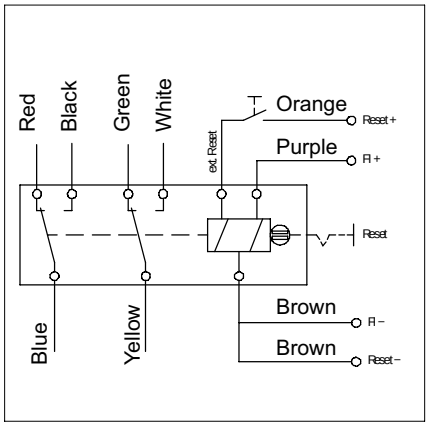
To adjust the protection relays, see the manual supplied with the switchboard.

9.2 WIC1 & DPX-1 protection relays

■ **WIC1**: Standard autonomous protection relay (without earthing fault).
Optional: with earthing fault.



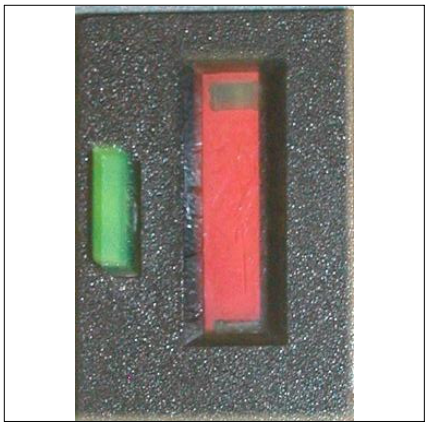
■ **DPX-1**: Autonomous protection relay with earthing fault detection and indicator light:
- flashing green: OK,
- fixed green: problem with the relay,
- fixed red: detection of fault current.



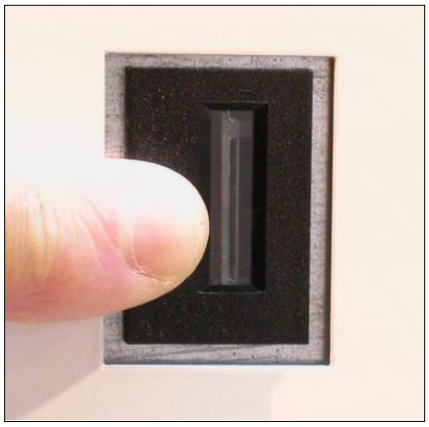
■ **WI1-SZ5**: Wiring connnectivity diagram.

9.3 WI1-SZ5 fault indicator

■ Indicator normal (no fault).



■ Indicator showing a fault (red).



■ Press the green button to delete the fault.

10.1 Levels of maintenance

Definition	Levels
Operations recommended in the instructions manual "installation - operation - maintenance", carried out by suitably qualified personnel having received training allowing them to intervene whilst respecting the safety rules.	1
Complex operations, requiring specific expertise and the implementation of support equipment in accordance with Schneider Electric's procedures. These are carried out by Schneider Electric or by a specialised technician, trained by Schneider Electric in the implementation of procedures, and who is equipped with specific equipment.	2
All preventive and corrective maintenance, all renovation and reconstruction work is carried out by Schneider Electric.	3

10.2 General Safety Instructions

⚠ WARNING

Never separate the C150 control mechanism from the circuit breaker part.

⚠ WARNING

Never remove the command control cover without having cut off the LV auxiliaries.

⚠ CAUTION

Ensure that the springs have been released by carrying out a complete O-C-O cycle.

10.3 Maintenance of the mechanical control mechanism

Under normal installation and service conditions, the CB630 circuit breaker requires no maintenance:
- throughout the 25 years of its service life,
- as long as it has not reached the maximum number of operating cycles.

NOTICE

By cycle we mean a closing then an opening operation.

⚠ WARNING

The internal electrical connections as well as the adjustments to the control mechanism are carried out at the factory and cannot be modified.

PREVENTIVE MAINTENANCE	Frequency	Levels		
Recommended operations	3 years	1	2	3
Inspection of the tightening of the threaded fasteners and presence of stop elements	X	-	X	X
Carry out a few opening and closing operations of the circuit breaker with the manual (and electrical) controls to ensure its correct operation.	X	-	X	X
Monitor the general appearance of the mechanical components and connections	X	-	X	X

10.4 Corrective maintenance

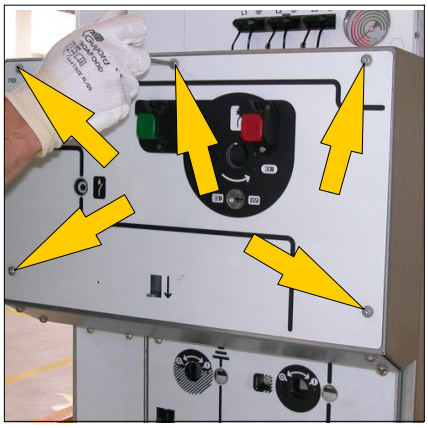
CORRECTIVE MAINTENANCE		Levels		
Replacements or modifications	See chapter	1	2	3
Replacement of the motor (1)	10.7	-	X	X
Replacement of the motor fuse (10)	10.8	X	X	X
Replacement of the closing coil (2)	10.9	-	X	X
Replacement of the tripping coil (3)	10.10	-	X	X
Replacement of an under/overvoltage tripping coil (4)	10.11	-	X	X
Replacement of the striker (5)	10.13	-	X	X
Replacement of the control card of the undervoltage tripping coil (6)	10.14	-	X	X
Replacement of a diode bridge (7)	10.15	X	X	X
Replacing the motor electronic control card (8)	10.16	-	X	X
Replacement of a motor reset contact (9)	10.17	-	X	X
Replacement of the operation counter (11)	10.18	X	X	X

Adaptation of additional functions	See chapter	1	2	3
Mounting of an undervoltage tripping coil (4)	10.19	-	X	X
Mounting of an additional voltage release tripping coil (4)	10.20	-	X	X
Mounting of an operation counter (11)	10.21	-	X	X

10.5 Removal of the protective cover for all maintenance operations

NOTICE

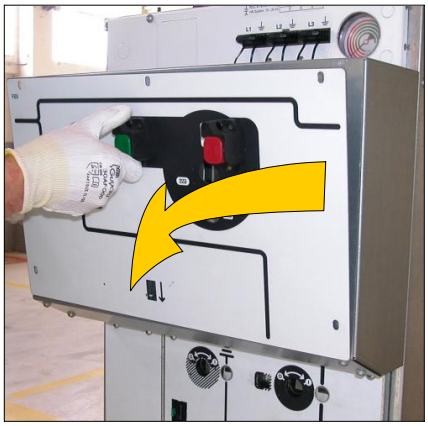
Maintenance operations absolutely must be carried out with the circuit breaker open and the control mechanism deactivated.



■ Unscrew the 5 attachment screws holding the front plates (Allen key for hexagonal screws size 4).

NOTICE

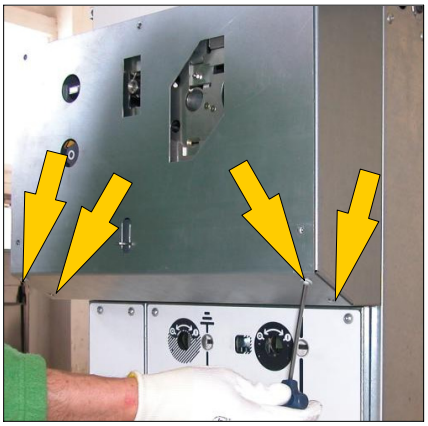
Cut off the LV auxiliaries' power circuits.



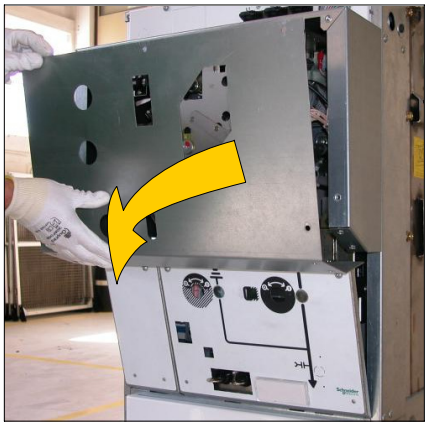
■ Remove the plate.

NOTICE

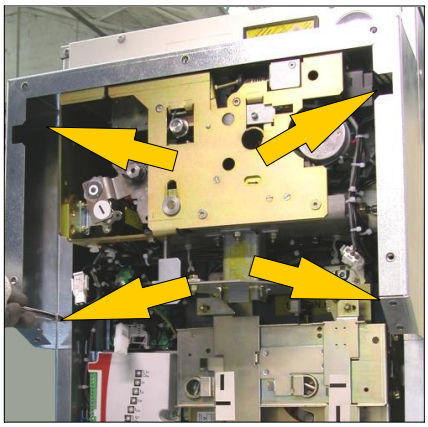
Complete replacement of a C150 control mechanism can only be carried out by Schneider Electric.



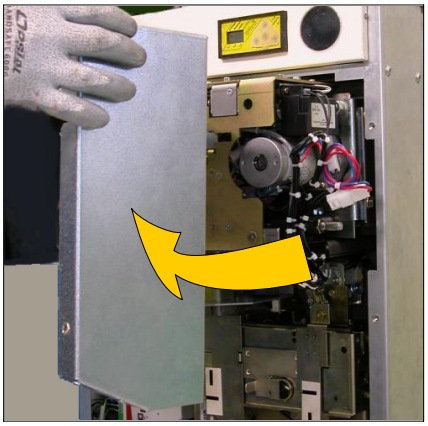
■ Unscrew the 4 cover fixing screws (Allen key for hexagonal screws size 4).



■ Remove the complete cover and twin front cover assembly.

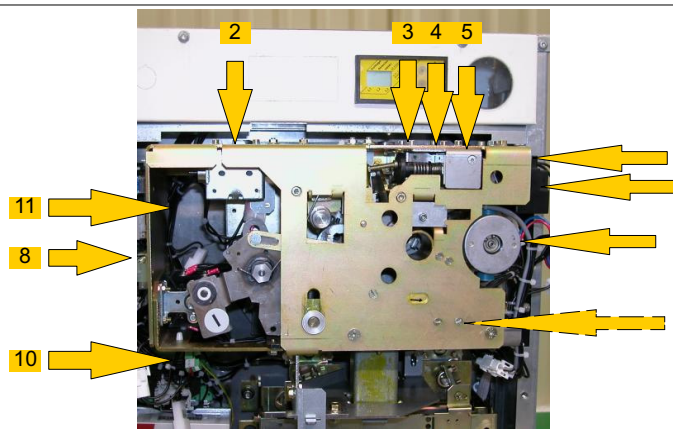


■ Unscrew the 4 cover mount fixing screws (Allen key for hexagonal screws size 4).



■ Pull off the cover mounts.

10.6 Location of LV components



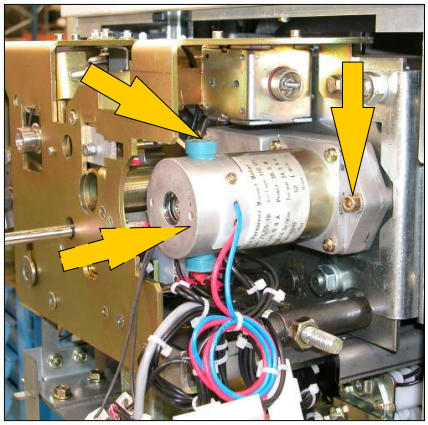
Key

- 1 *Motor*
- 2 *Closing Coil*
- 3 *Tripping Coil on voltage release*
- 4 *Supplementary tripping coil on voltage release or undervoltage tripping coil*
- 5 *Striker*
- 6 *Electronic control card for voltage release coil*
- 7 *Diode bridge*
- 8 *Electronic motor board*
- 9 *Motor rearming contacts*
- 10 *Motor fuses*
- 11 *Operating counter (missing on this picture)*

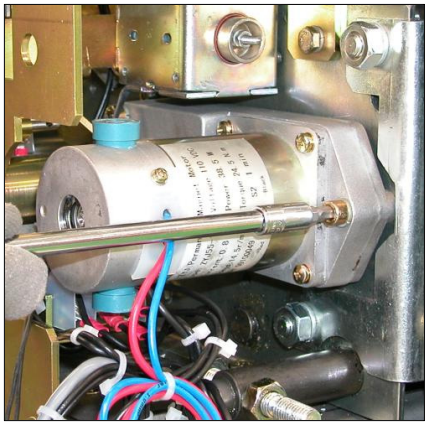
■ Location of LV elements.

10.7 Replacement of the motor (1) [See § 10.6]

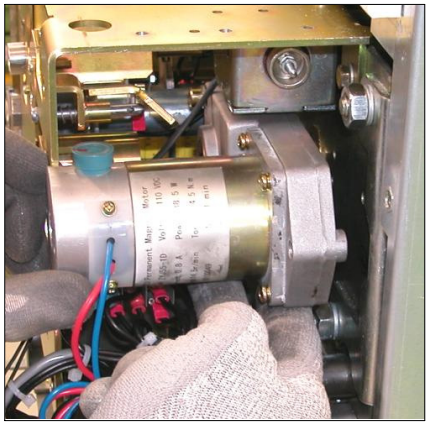
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Cutting pliers - Allen keys for hexagonal screws size 5 + extension and ratchet wrench	Parts required: - 1 motor of the same reference - 3 washers + 3 mounting bolts - 3 Rilsan cable ties Duration: 1 h 30



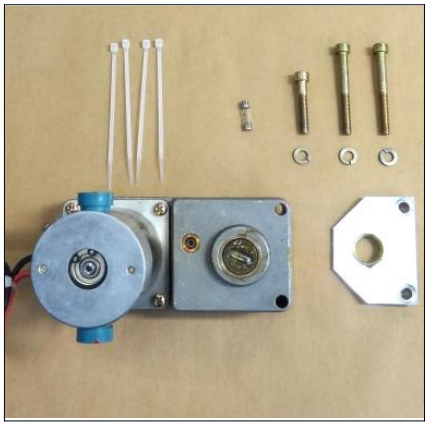
- Disconnect the LV cables from the motor.
- The motor is kept in place by its 3 fixing points.



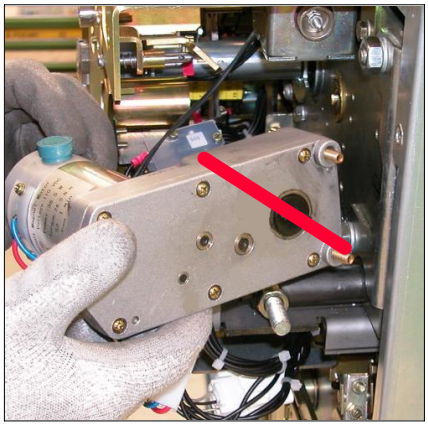
- Unscrew each of the the fixing screws (Allen key for hexagonal screws size 5).



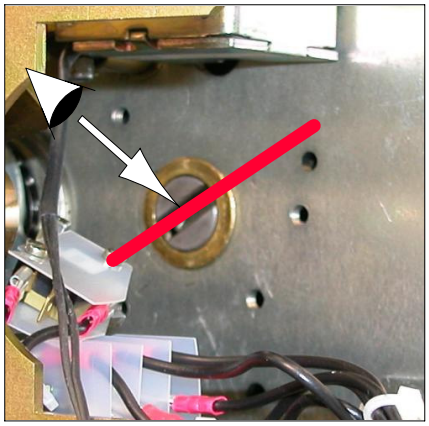
- Remove and extract the motor.



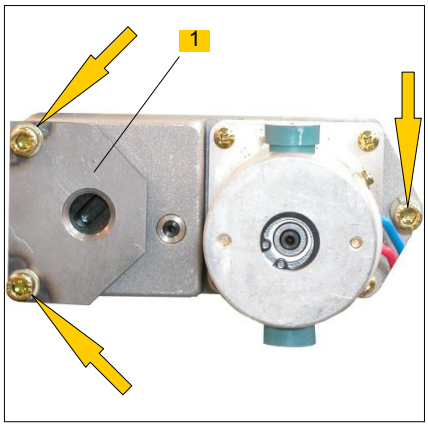
- Supply kit also containing this notice.



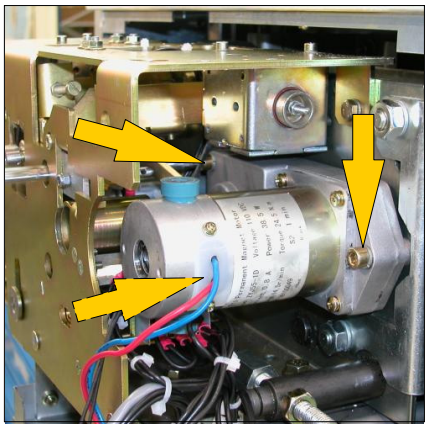
- Present the new motor.
- Identify the drive pin.



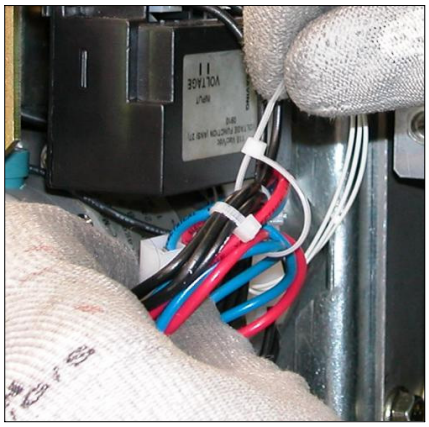
- Using the lever, turn the mechanism's shaft clockwise to align the slot with the pin.



- Engage the motor with its centring device (1) and use the 3 bolts and **3 new washers supplied.**
- Insert the operating lever to align the centring device and motor drive shaft.



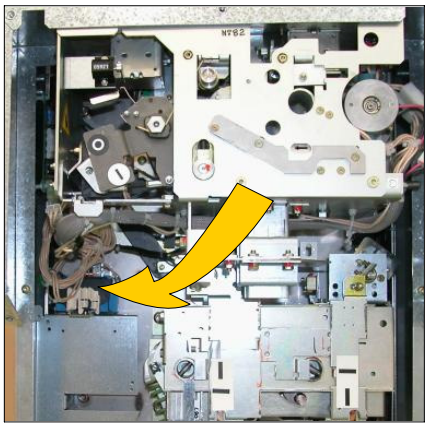
- Make sure that the three mounting points are flat against the partition panel.
- Tighten the fixing bolts.



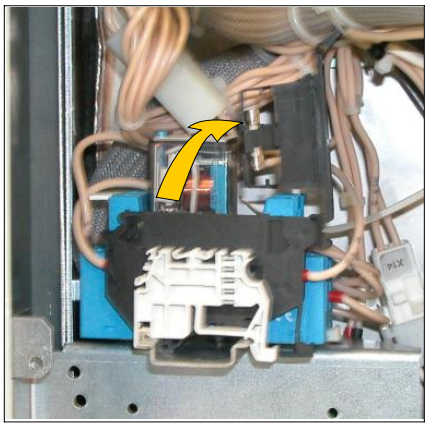
- Reconnect the motor wires.
- Re-clamp the cables.

10.8 Replacement of the motor fuse (10) [See Section 10.6]

Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Allen key for hexagonal screw size 3 - Flat headed screwdriver	Parts required: - 1 fuse with the same reference Duration: 0 h 30



- The motor fuse is located in the black fuse holder.



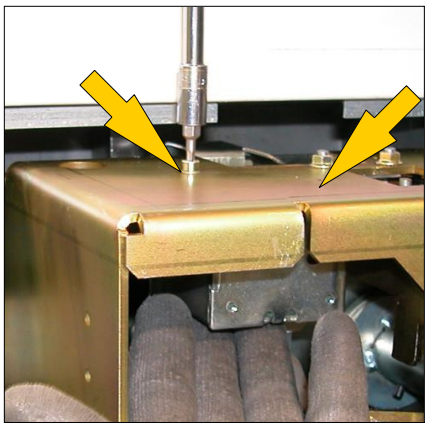
- Open the fuse holder.
- Replace the fuse then close the holder.

Voltage	Fuse
24 VDC	8 A
48 VDC	5 A
60 VDC	4 A
110 VDC / 110 VAC	2 A
125 VDC / 125 VAC	1,6 A
220 VDC	1 A
230 VAC	0,8 A

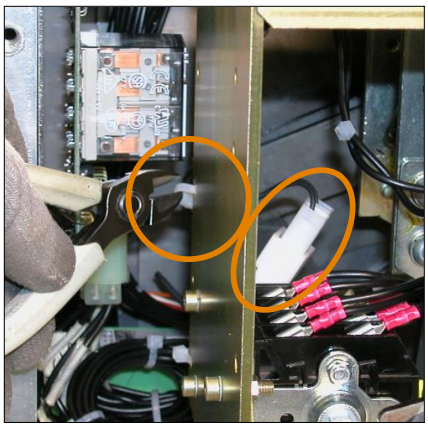
- Tables of correspondence between SCHURTER type fuses (20x5)

10.9 Replacement of the closing coil (2) [See Section 10.6]

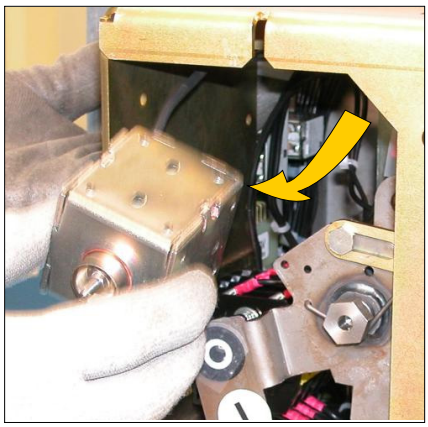
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Cutting pliers - Allen key for hexagonal screw size 3 - 2 x open-ended spanners - size 7	Parts required: - 1 coil with the same reference - 2 pre-treated bolts and 2 washers - 3 Rilsan cable ties Duration: 1 h



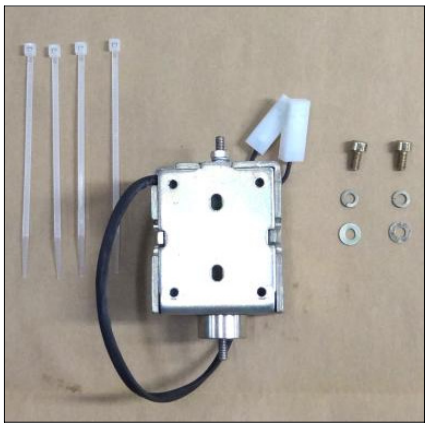
- Hold the coil in place.
- Unscrew and remove the 2 fixing bolts (Allen key of 3 mm).



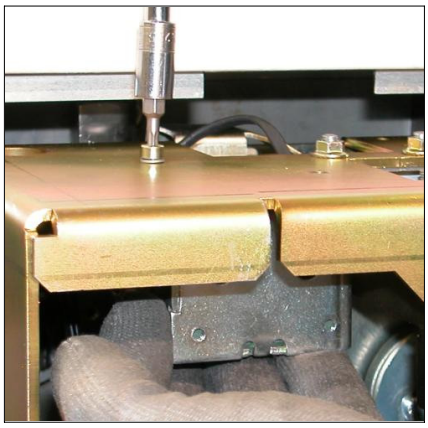
- Cut the fixing collars on the wiring.
- Disconnect the connector from the coil.



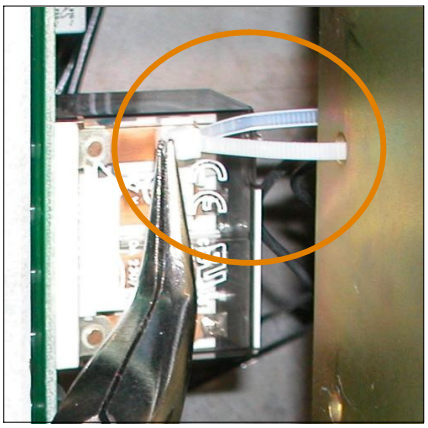
- Extract the coil from the front.



- Supply kit also containing this notice.



- Positioning the new coil.
- Insert and tighten the 2 **new mounting bolts supplied**.



- Reconnect the LV connector.
- Fix the cables in place using Rislan cable ties.

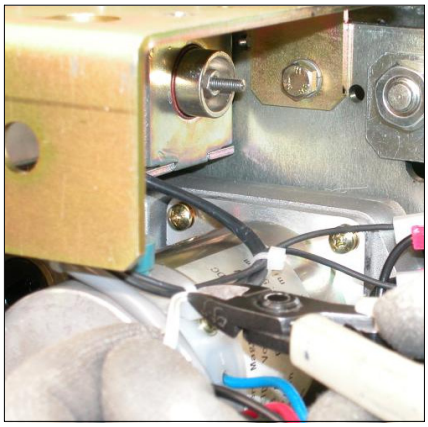
10.10 Replacement of the tripping coil (3) [See Section 10.6]

Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Cutting pliers - Allen key for hexagonal screw size 3 & 4 - 2 x open-ended spanners - size 7	Parts required: - 1 coil with the same reference - 2 pre-treated bolts + 2 plate washers + 2 grower washers - 3 Rilsan cable ties Duration: 1 h 30

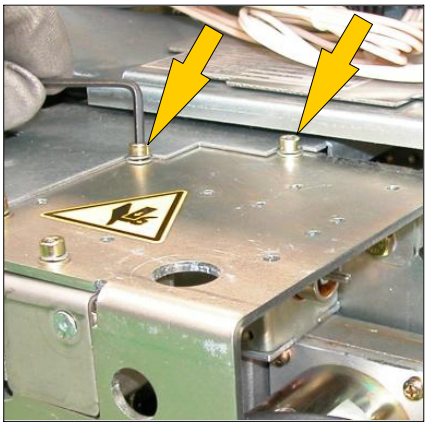
NOTICE

If an additional voltage release or undervoltage tripping coil is present, it will be necessary to dismount it and remount it after the fuse is replaced. See instructions in section 10.11.

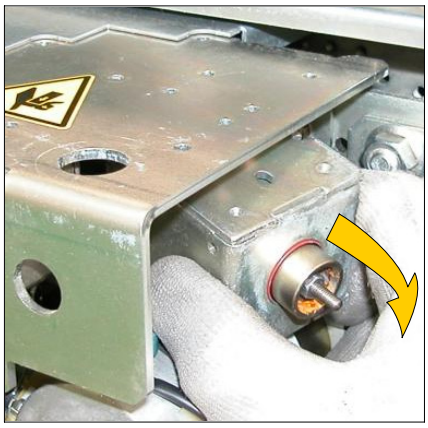
- Unscrew the two fixing screws on the LV compartment display panel (Allen key - size 4).
- Unclip the panel and place it on the top of the FBX panel.



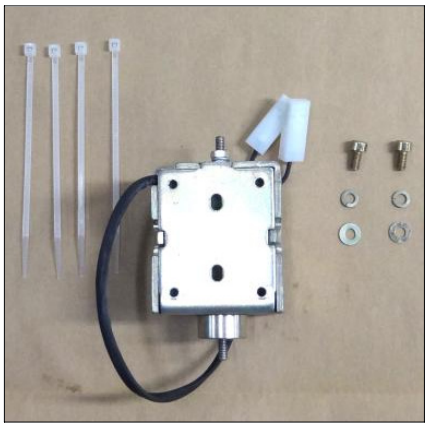
- Cut the fixing collars on the wiring.
- Disconnect the connector from the coil.



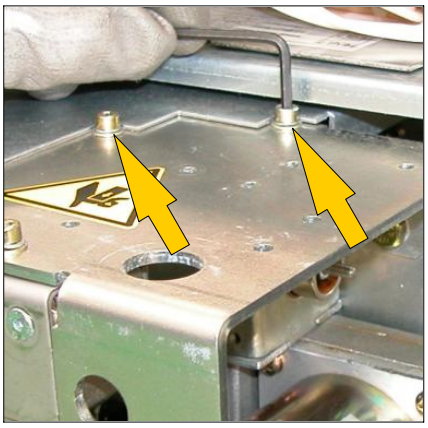
- Hold the coil in place.
- Unscrew and remove the 2 fixing bolts (Allen key of 3 mm).



- Note which way round the coil goes.
- Remove this coil from the right hand side.



- Supply kit for a voltage release coil also containing this notice.



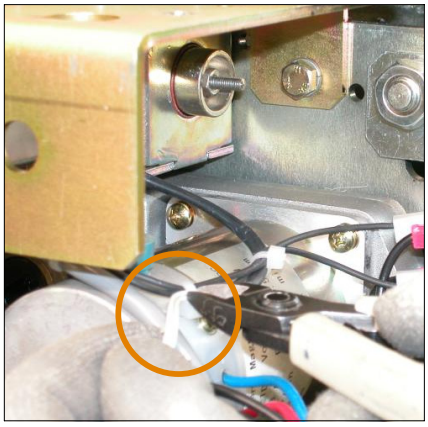
- Positioning the new coil.
- Insert and tighten the 2 **new mounting bolts supplied**.

10.11 Replacement of a supplementary tripping coil release or undervoltage tripping coil (4) [See Section 10.6]

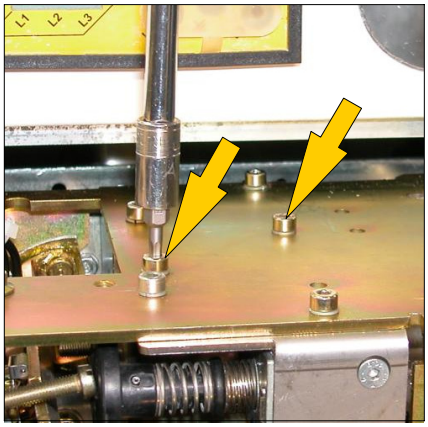
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Cutting pliers - Allen key for hexagonal screw size 3 - 2 x open-ended spanners - size 7	Parts required: - 1 coil with the same reference - 2 pre-treated bolts and 2 washers - 3 Rilsan cable ties Duration: 1 h

NOTICE

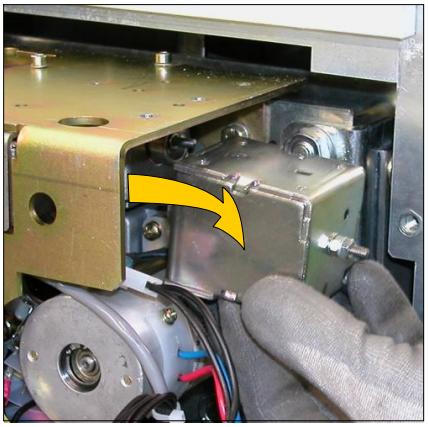
Coil (4) may be either on voltage release or undervoltage/application.



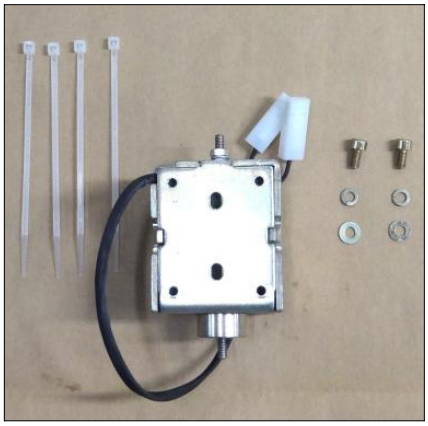
- Cut the fixing collars on the wiring.
- Disconnect the connector from the coil.
- For an undervoltage trip coil, remove the coil board (see § 10.14).



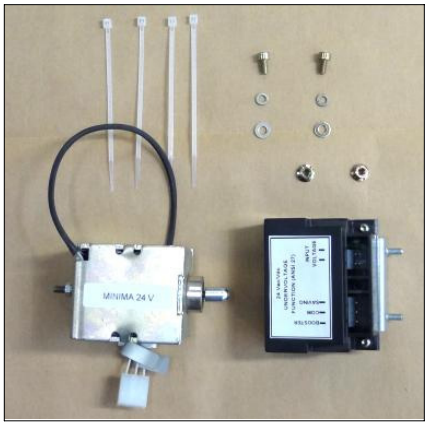
- Hold the coil in place.
- Unscrew and remove the 2 fixing bolts (Allen key of 3 mm).



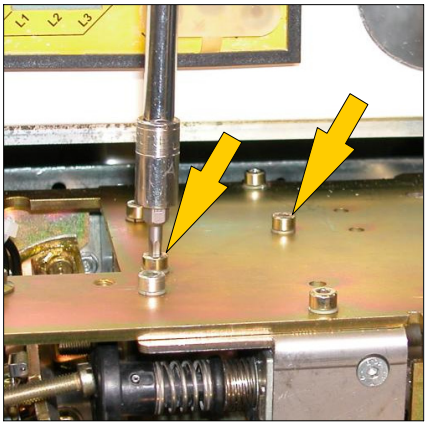
- Note which way round the coil goes.
- Remove this coil from the right hand side.



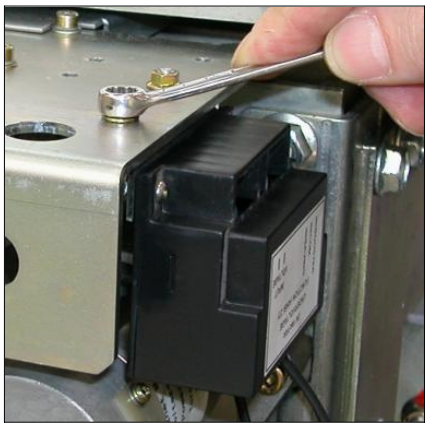
- Supply kit for a voltage release coil also containing this notice.



- Supply kit for an undervoltage coil also containing this notice.



- Positioning the new coil.
- Insert and tighten the 2 **new mounting bolts supplied**.



- For an undervoltage coil, install the new board (See § 10.14).

- Reconnect the LV connector.
- Fix the cables in place using Rislan cable ties.

10.12 Coil power

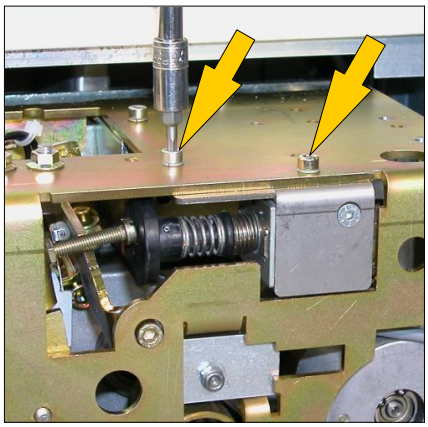
Voltage	Undervoltage coil		Voltage release coil
	Inrush power	Holding power	Inrush power
24 VDC	240 W	4.6 W	960 W
48 VDC	256 W	4.7 W	470 W
60 VDC	248 W	7.0 W	450 W
110 VDC	172 W	4.0 W	620 W
125 VDC	166 W	4.2 W	521 W
220 VDC	193 W	3.5 W	386 W
120 VAC	164 W	4.5 W	521 W
230 VAC	266 W	4.1 W	386 W

10.13 Replacement of the striker (5) [See section 10.6]

Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Cutting pliers - Allen key for hexagonals screw size 3 - 2 x open-ended spanners - size 8	Parts required: - 1 striker pin with the same reference - 2 pre-treated bolts and 2 washers - 3 Rilsan cable ties Duration: 1 h

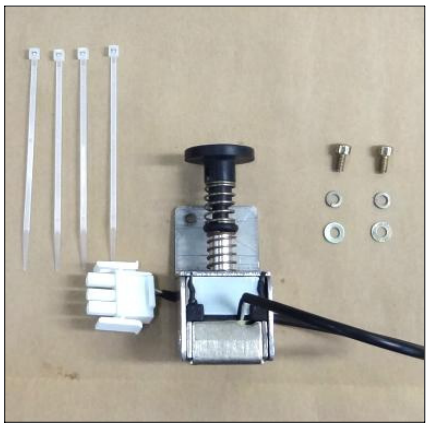
NOTICE

To change the striker (5), first remove the trip coil (4) (See section 10.11).

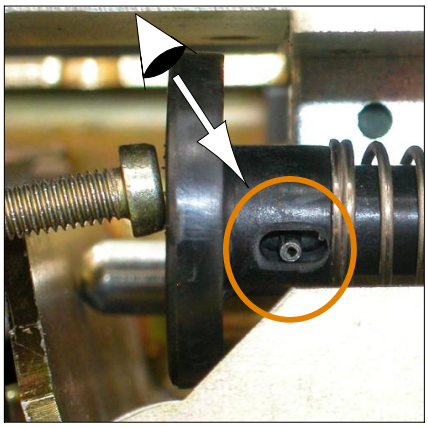


- Cut the fixing collars on the wiring.
- Disconnect the connector from the striker.
- Hold the striker in place.
- Unscrew and remove the 2 fixing bolts (Allen key of 3 mm).

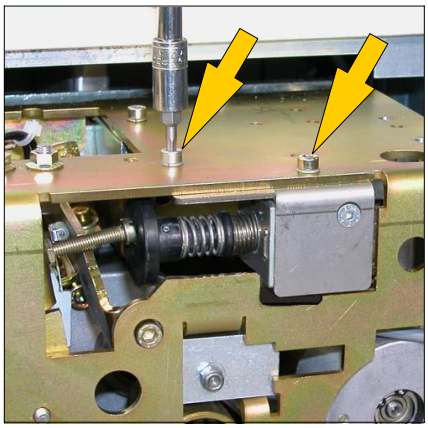
- Remove the striker from the front.



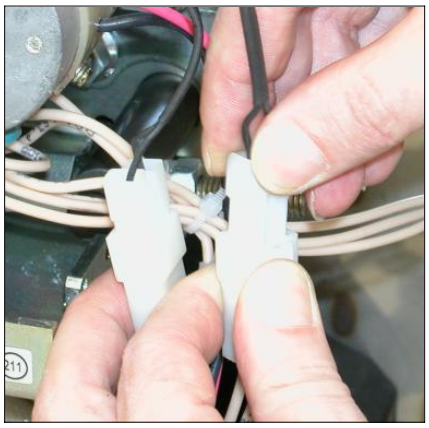
- Supply kit also containing this notice.



- Position the new striker so that it presses against the screw head: the pin is in the centre of the light.



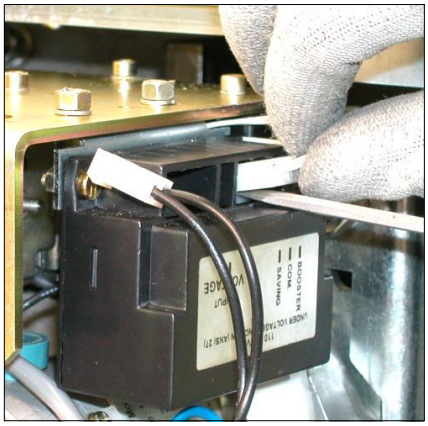
- Insert and tighten the 2 **new mounting bolts supplied**.



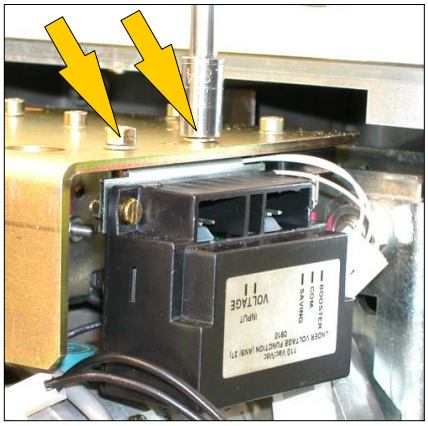
- Reconnect the LV connector.
- Fix the cables in place using Rislan cable ties.

10.14 Replacing the undervoltage coil control board (6) [See section 10.6]

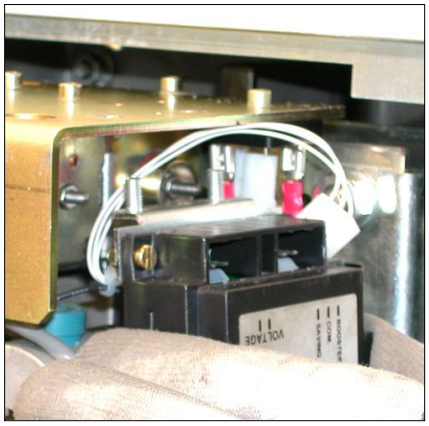
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Flat headed screwdriver - 8 mm spanner	Parts required: - 1 board of the same reference Duration: 0 h 30



- Using a flat headed screwdriver, loosen the two connectors.



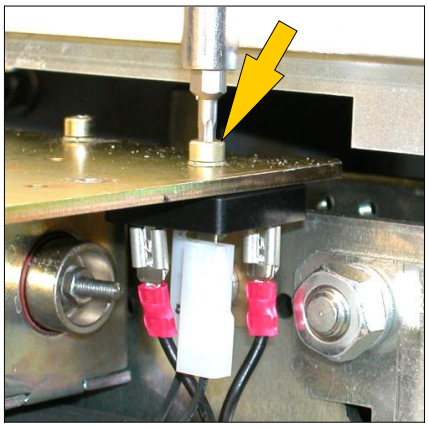
- Unscrew the 2 fixing screws (8 mm spanner).



- Pull out the board.
- Attach and reconnect the new board in its place.

10.15 Replacing the diode bridge (7) [See section 10.6]

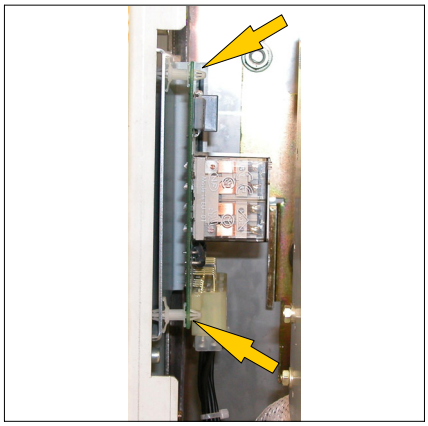
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Allen key for hexagonal screw size 3 - Flat headed screwdriver	Parts required: - 1 diode bridge of the same reference Duration: 0 h 30



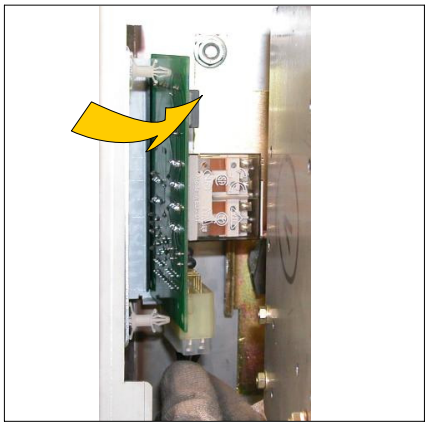
- Unscrew the central bolt holding the bridge in place.
- Replace the diode bridge
- Refit the new bridge in its place.

10.16 Replacing the motor control board (8) [See Section 10.6]

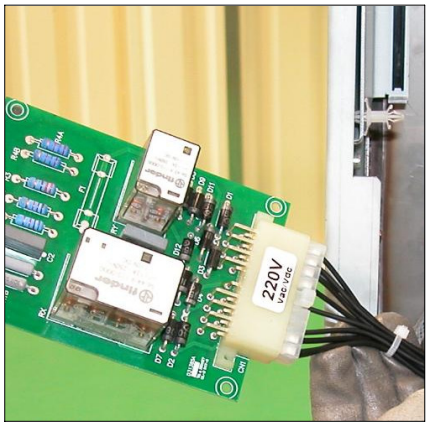
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Allen key for hexagonal screw size 3 - Flat headed screwdriver	Parts required: - 1 board of the same reference Duration: 1 h 00



- The motor control board is lodged against the left hand upright in the C150 control compartment.
- Press the two pins on the front to free the board.

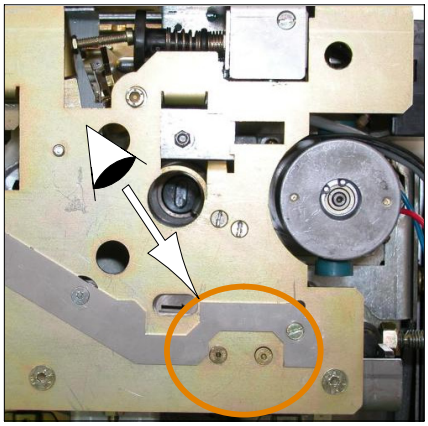


- Lightly push the board aside then pull forwards to free from its rear connector.
- Pull out the board from the bottom.



- Disconnect the board.
- Replace the board with one of the same reference.
- Repeat the operations detailed above in reverse to refit the new board.

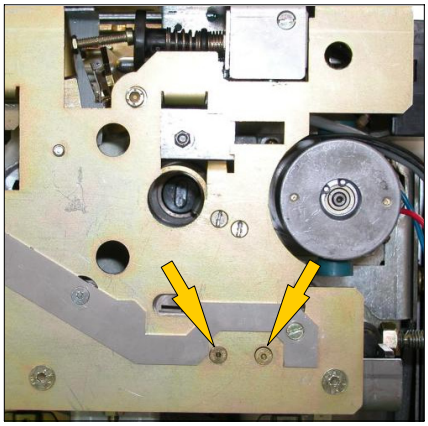
10.17 Replacing a motor re-arming contact (9) [mechanical control tripped and un-armed] [See section 10.6]



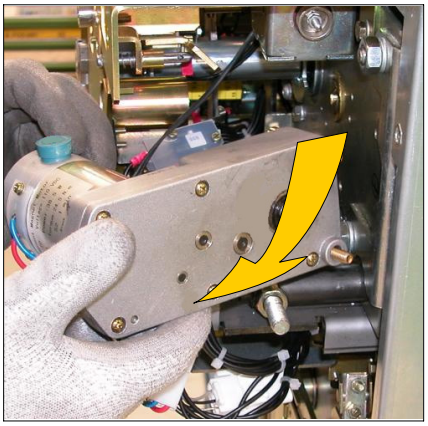
- The motor re-arming contacts are located in the bottom right hand corner of the C150, behind the front panel.

⚠ CAUTION

The screw on the left has a lock nut.

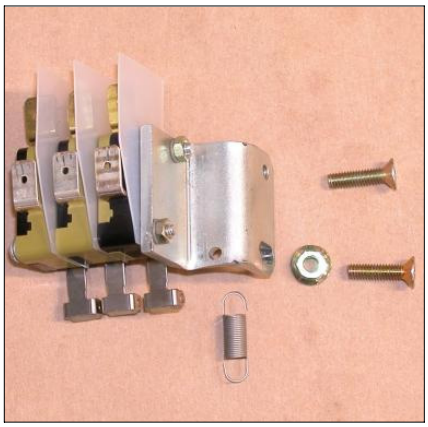


- By inside, unlock the lock nut of the left screw (box spanner 7).
- Loosen then remove the two mounting bolts from the front (Allen key for hexagonal screw size 2.5).
- Unhook the return spring.
- Mark and disconnect the LV wires.

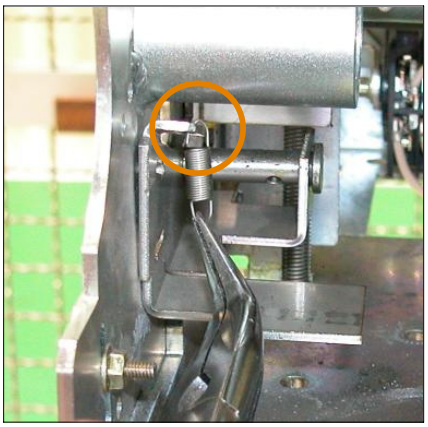


- Remove the motor according to the instructions in § 10.7 to enable easy access to the upper spring fastening.

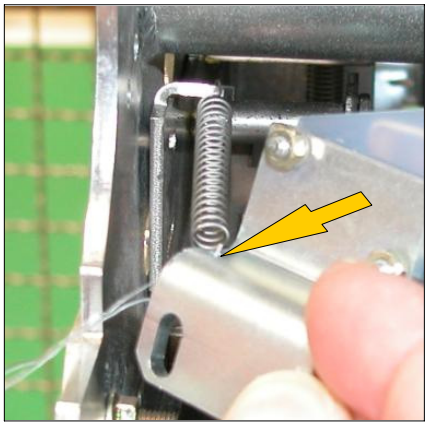
- Unscrew the two lever contact support screws to enable easy access to the upper spring fastening.



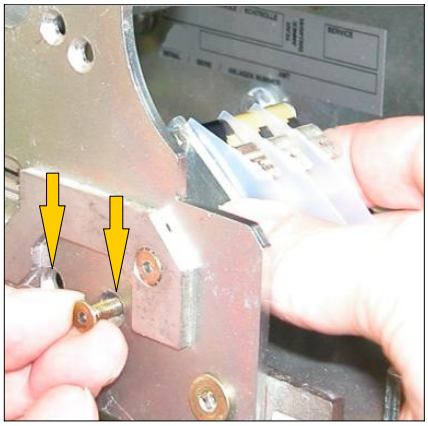
- Supply kit for rearm contact



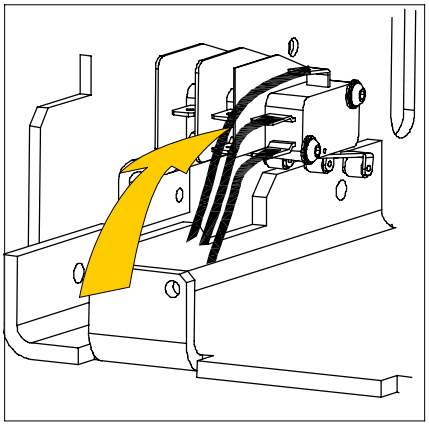
- Remove the old spring.
- Hook the new spring in place.



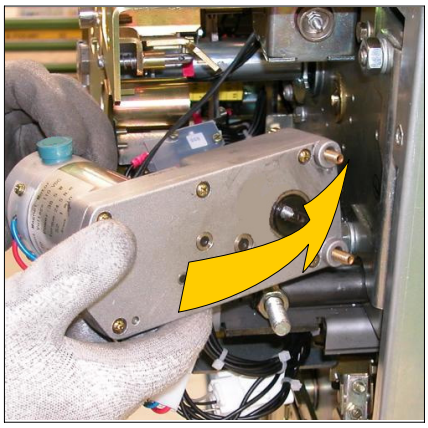
- Bring the new support and its contacts close to the spring.
- Using a wire, hook the other spring coil into the support hole.



- Fix the support in place with two new screws **but do not tighten them fully**.

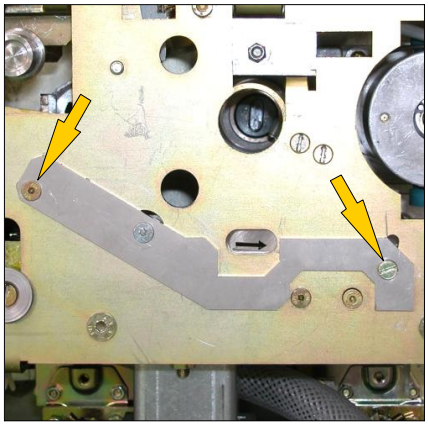


- Reconnect the wires.

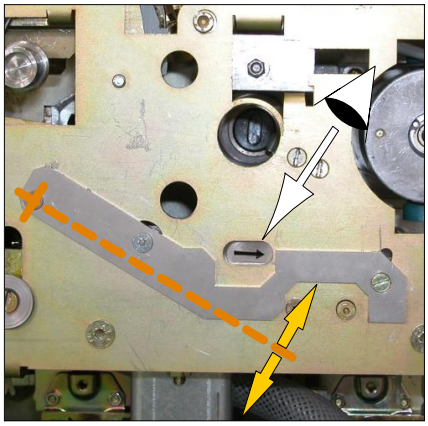


- Refit the lever safety contact and fix it in place using 2 screws.
- Refit the motor and fix it in place according to the instructions in § 10.7.

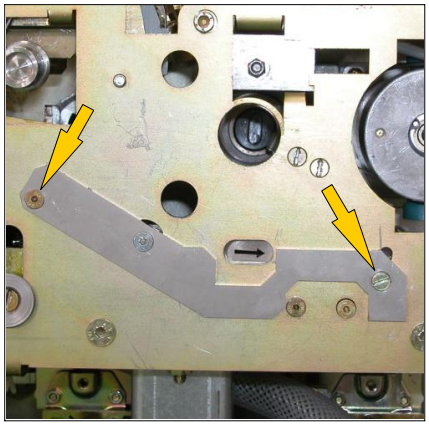
Adjust the motor arming lock before this one of electrical arming contacts



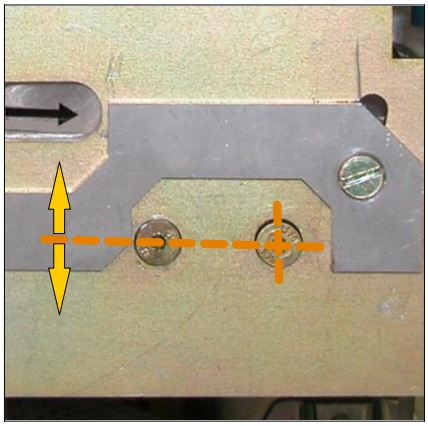
- Loosen the 2 screws on the end of the lock slightly.



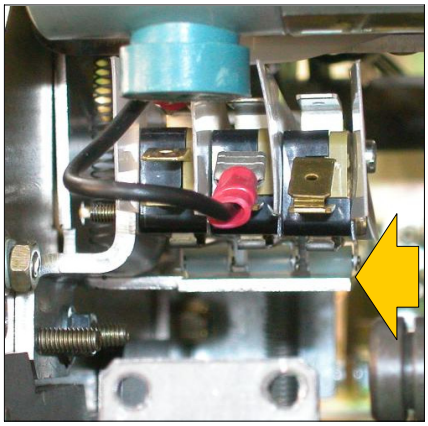
- Turn this lock to align the arrow horizontally in the window.



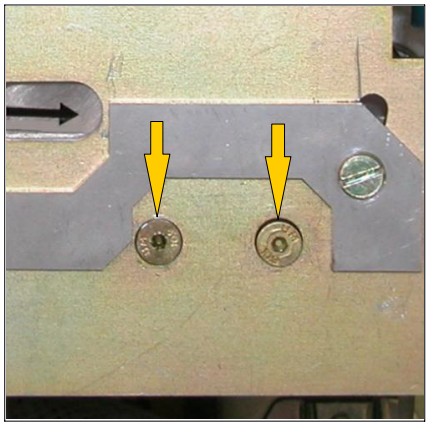
- Once this adjustment has been made, tighten the 2 screws (Allen key for hexagonal screw size 2.5).



- Turn the mount to bring the contact tabs into contact with the lock.



- View of the inside of the mechanism: The tabs are pressing against the lock probe.

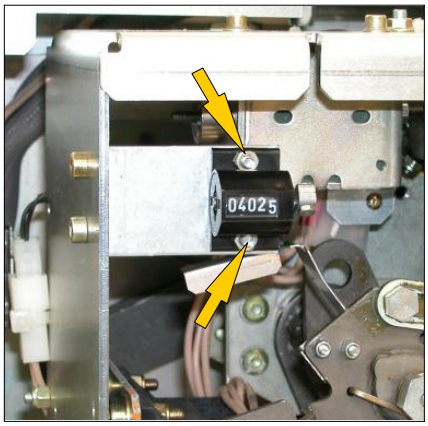


- Tighten the 2 fixing screws (Allen key for hexagonal screw size 2.5).
- By inside, tighten the lock nut of the left screw (box spanner 7).

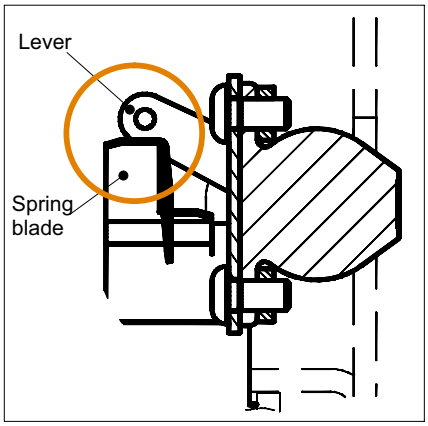
10.18 Replacement of an operation counter (11) [See section 10.6]

Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Allen key for hexagonal screw size 3 - Flat headed screwdriver	Parts required: - 1 Operation counter with its lever Duration: 1 h 00

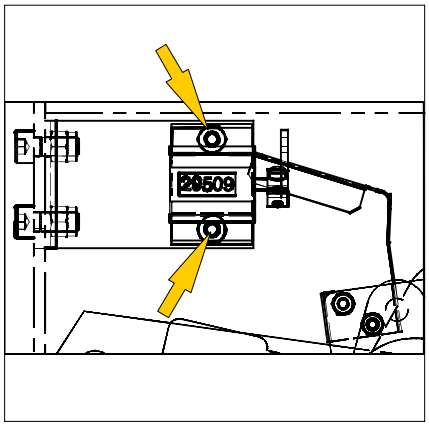
For CB 2000 operatings



- The operation counter is held in place on its support by 2 screws.
- Loosen and remove these 2 screws.

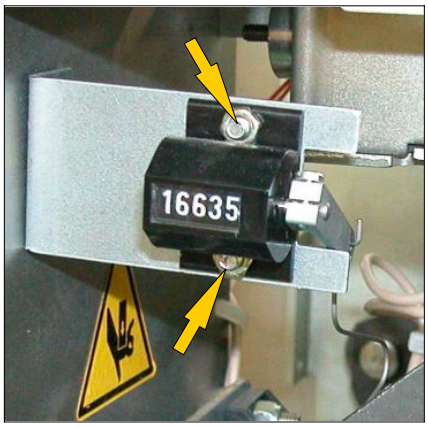


- Fit the new counter: the lever should be positioned above the spring blade.

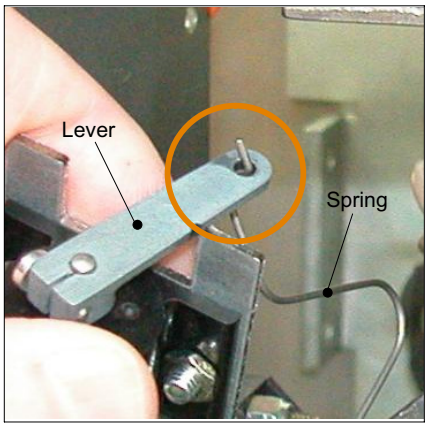


- Insert and tighten the 2 fixing screws.
- The operation counter is operational starting at the number indicated: it cannot be reset to zero.

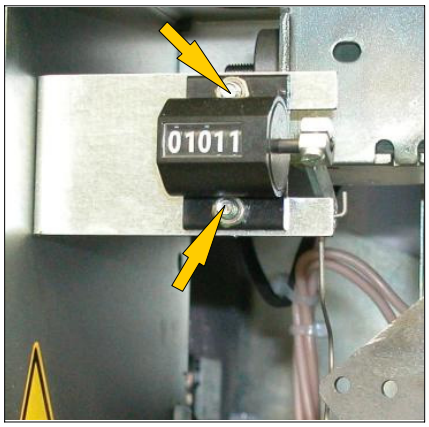
For CB 10000 operatings



- The operation counter is held in place on its support by 2 screws.
- Loosen and remove these 2 screws.



- Unclamp the spring attached to the lever.
- Extract the counter.
- Attach the spring to the new counter's lever.

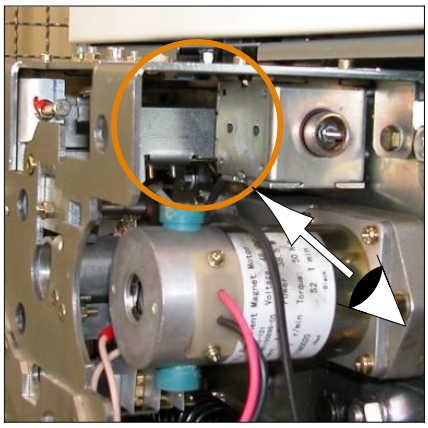


- Insert and tighten the 2 fixing screws.
- The operation counter is operational starting at the number indicated: it cannot be reset to zero.

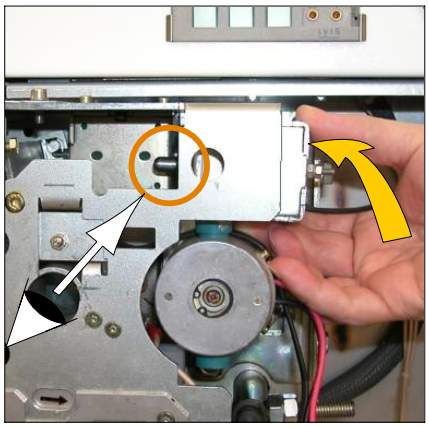
10.19 Mounting of an undervoltage tripping coil (4) [See section 10.6]

Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Cutting pliers - Ratchet wrench + extension + size 5 Allen key socket - Allen key for hexagonal screw size 3	Parts required: - 1 adaptation kit for undervoltage tripping coil (see below) Duration: 1 h 30

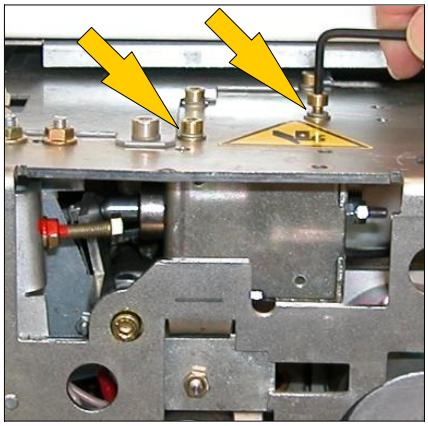
- Adaptation kit for an undervoltage coil also containing this notice.



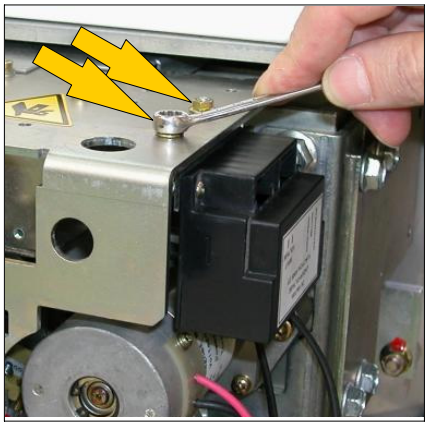
- Free housing for installation of coil.



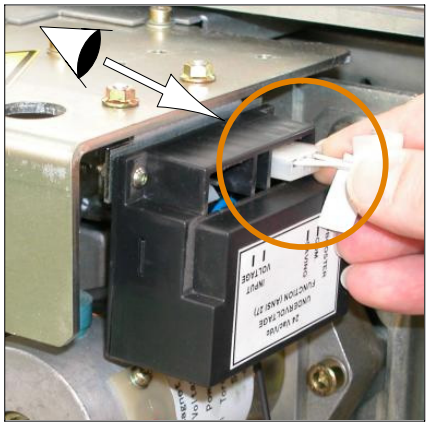
- Insert the coil from the right, the rounded striker in the front.



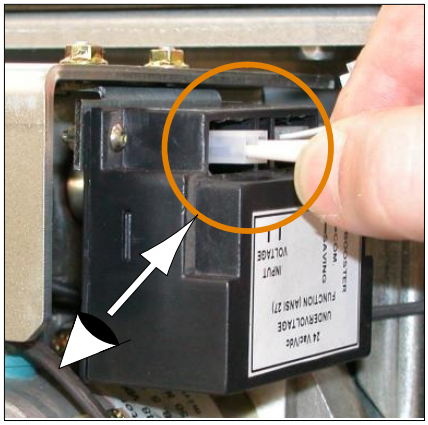
- Hold the coil in place.
- Insert the two screws and two washers.
- Tighten the two screws (size 3 Allen key).



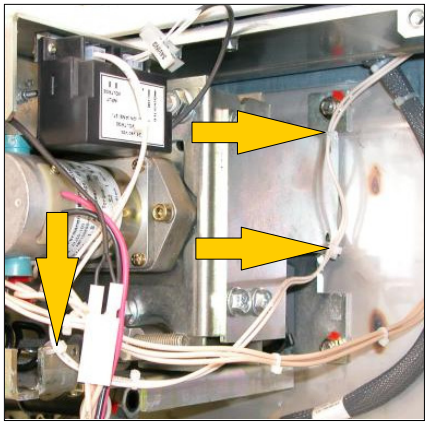
- Install the coil board.
- Screw and tighten the 2 nuts.



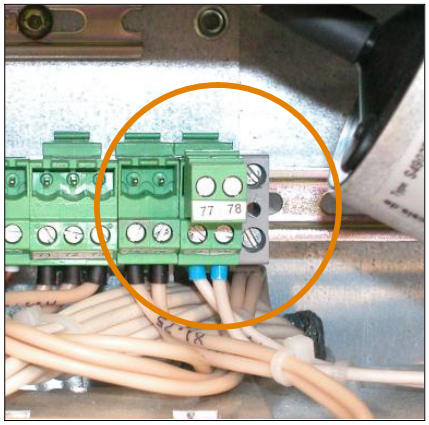
- Connect the wires of the new coil.



- Connect the wiring cables connector to the coil board.



- Position the wiring cables and lift it into the LV compartment.
- Attach the wiring cables at 3 points using the cable ties.



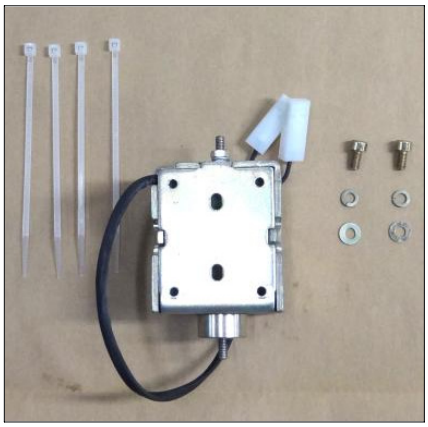
- Loosen and push the end stop at the far right of the lower rail to the right.
- Position the 2 terminals of the wiring cables in the space made available.
- Tighten then block the end stop in place.

⚠ CAUTION

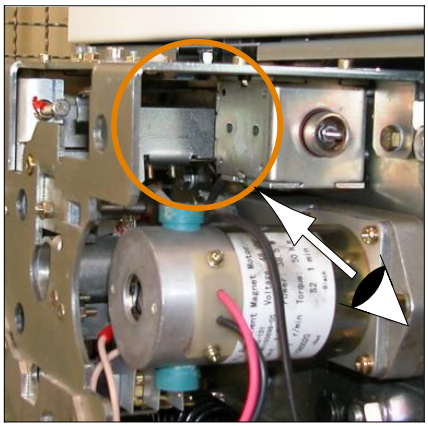
It is now mandatory to energize this coil to trip the circuit breaker.

10.20 Mounting of an additional voltage release tripping coil (4) [See section 10.6]

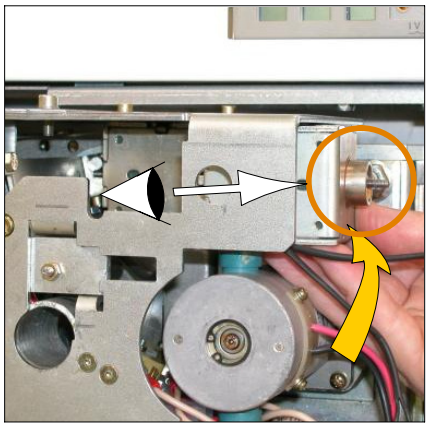
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Cutting pliers - Allen key for hexagonal screw size 3 - 2 x open-ended spanners - size 7	Parts required: - 1 Adaptation kit for additional coil (see below) Duration: 1 h 00



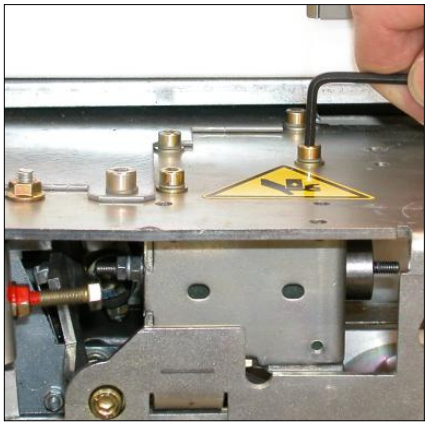
- Adaptation kit for a voltage release coil also containing this notice.



- Free housing alongside the first trip coil to install the second coil.



- Insert the coil from the right, the protruding part of the hub facing the rear.



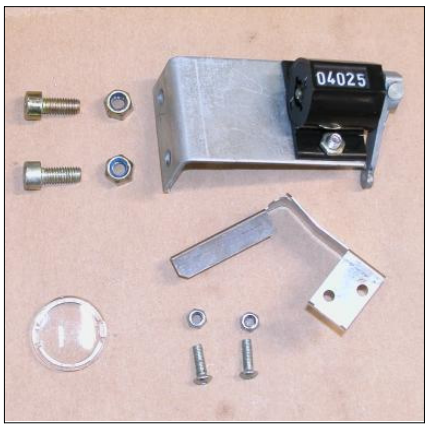
- Hold the coil in place.
- Insert the two screws and two washers.
- Tighten the two screws (size 3 Allen key).

- Connect the connector to the corresponding wiring cables.
- Clamp the cables in place using the cable ties.

10.21 Mounting of an operation counter (11) [See section 10.6]

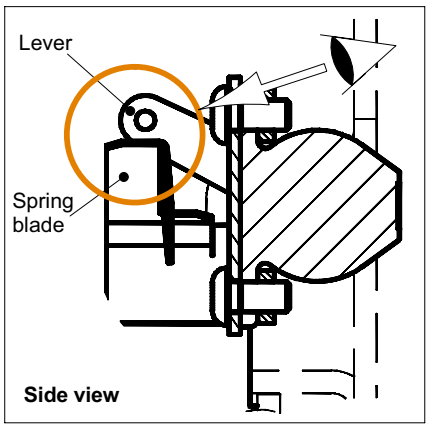
Apply the General Safety Instructions for Electrical Applications and the particular rules for the network concerned for locking out procedures.	Tools required: - Allen key for hexagonal screw size 3 - Pipe wrench size 5.5 - 1 hammer - 1 copper drift pin	Parts required: - 1 adaptation kit for operation counter (See below). Duration: 1 h 00

For CB 2000 operatings

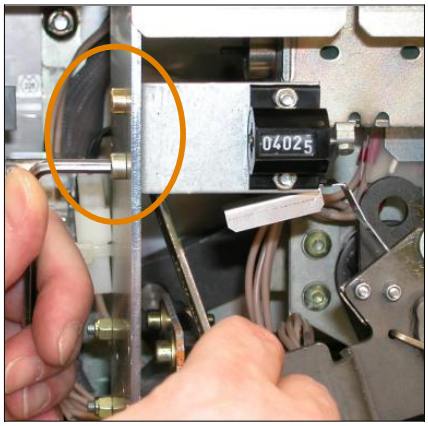


- Adaptation kit for an operation counter also containing this notice.

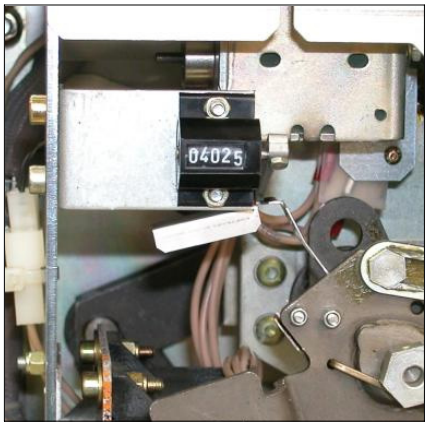
- Position the spring blade on the drive bearing.
- Fix the spring blade in place using the 2 small screws and 2 nuts.
  Note: the nut is placed on the outside.



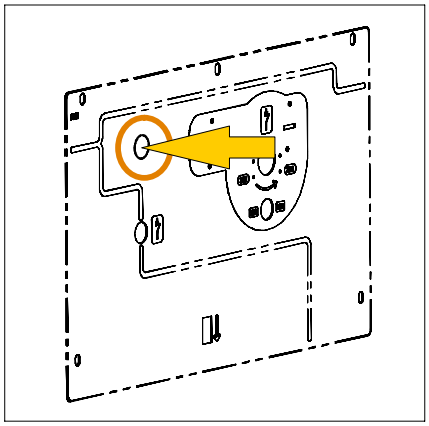
- Fit the counter: the lever should be positioned above the spring blade.



- Fix the counter support to the vertical plate using the 2 screws and 2 nuts supplied.

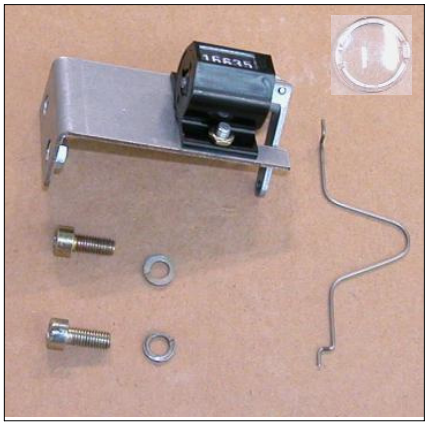


- The operation counter is operational starting at the number indicated: it cannot be reset to zero.

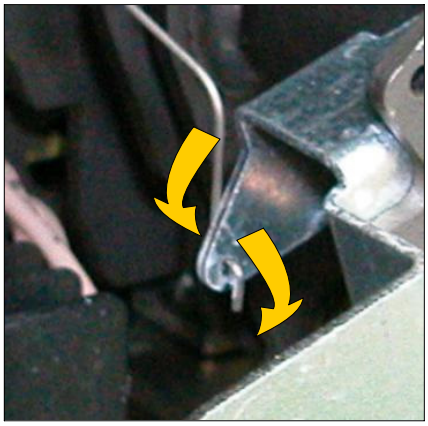


- On the front plate, knock out the plug facing the counter (hammer + copper drift pin).
- Clip the small round porthole onto this housing.

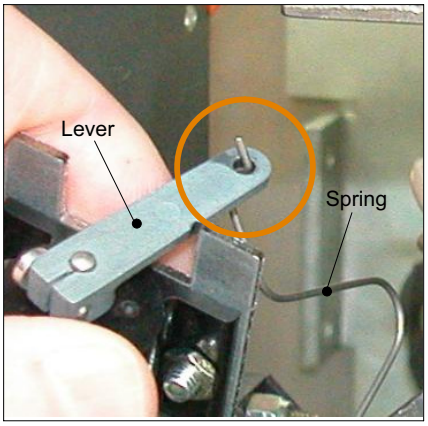
For CB 10000 operatings



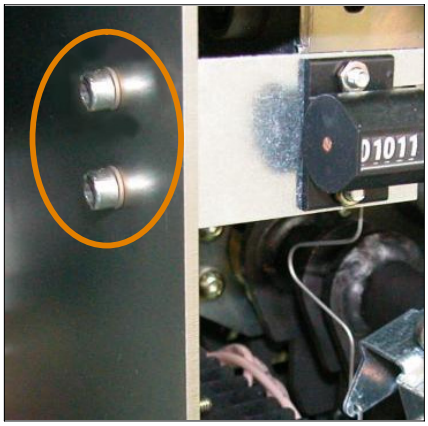
- Adaptation kit for an operation counter also containing this notice.



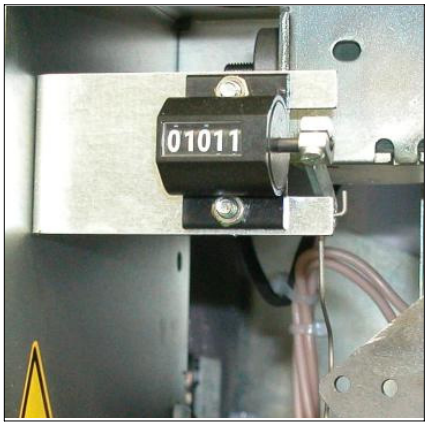
- Insert the bottom of the spring into the hole on the drive bearing.



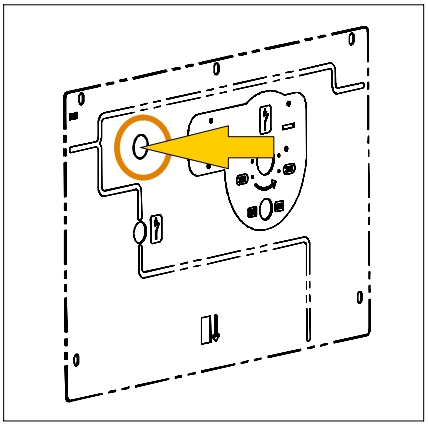
- Insert the top of the spring into the hole on the counter lever.



- Fix the counter support to the vertical plate using the 2 screws and 2 washers supplied.



- The operation counter is operational starting at the number indicated: it cannot be reset to zero.



- On the front plate, knock out the plug facing the counter (hammer + copper drift pin).
- Clip the small round porthole onto this housing.

11 Politicy for Adaptation and Replacement of Schneider Electric

11.1 Definitions

Spare part is a part that is designed to replace an existing one with a view to re-establishing or maintaining the original function.

PAR (Policy for Adaptation and Replacement) is a technical manual which setting out in detail the Schneider Electric policy for the supply and replacement of spare parts for the purposes of maintenance, adaptation or renovation.

FAR is a technical notice or leaflet setting out the spare part replacement procedure for the purposes of maintenance, adaptation or renovation.

11.2 Different categories of spare parts [according to NF EN 13306 - NF X 60-319]

Consumable	Use
Wearing parts, designed to be replaced after a predetermined number of uses.	Maintenance stock, required to ensure optimum maintenance operations for 6 years.

Spare part	Use
Part designed for unscheduled replacement but with a lifetime that may be reduced through particular conditions of use.	Safety stock of spare parts replaced during corrective maintenance.

Spare part for exceptional purposes	Use
Spare part that is normally not necessary during the lifetime of a product.	Safety stock of spare parts or sub-assemblies replaced during urgent corrective maintenance.

11.3 Supply of spare parts

Individual supply	Use
Spare part ordered occasionally by the customer.	Specific need due to an accident or the destruction of the original part.

Supplied on commissioning	Use
All parts supplied at time of commissioning	Preventive stock of spare parts replaced during installation of panel.

Supplied on Short list	Use
All parts supplied for first maintenance procedure.	Maintenance stock, required to ensure optimum maintenance operations for 6 years.

Supplied on List	Use
All parts or sub-assemblies stocked on customer site.	Safety stock of spare parts or sub-assemblies replaced during urgent corrective maintenance.

11.4 Identification and storage of the parts

NOTICE

For all orders for spare parts, it is necessary to enclose the equipment characteristics form.

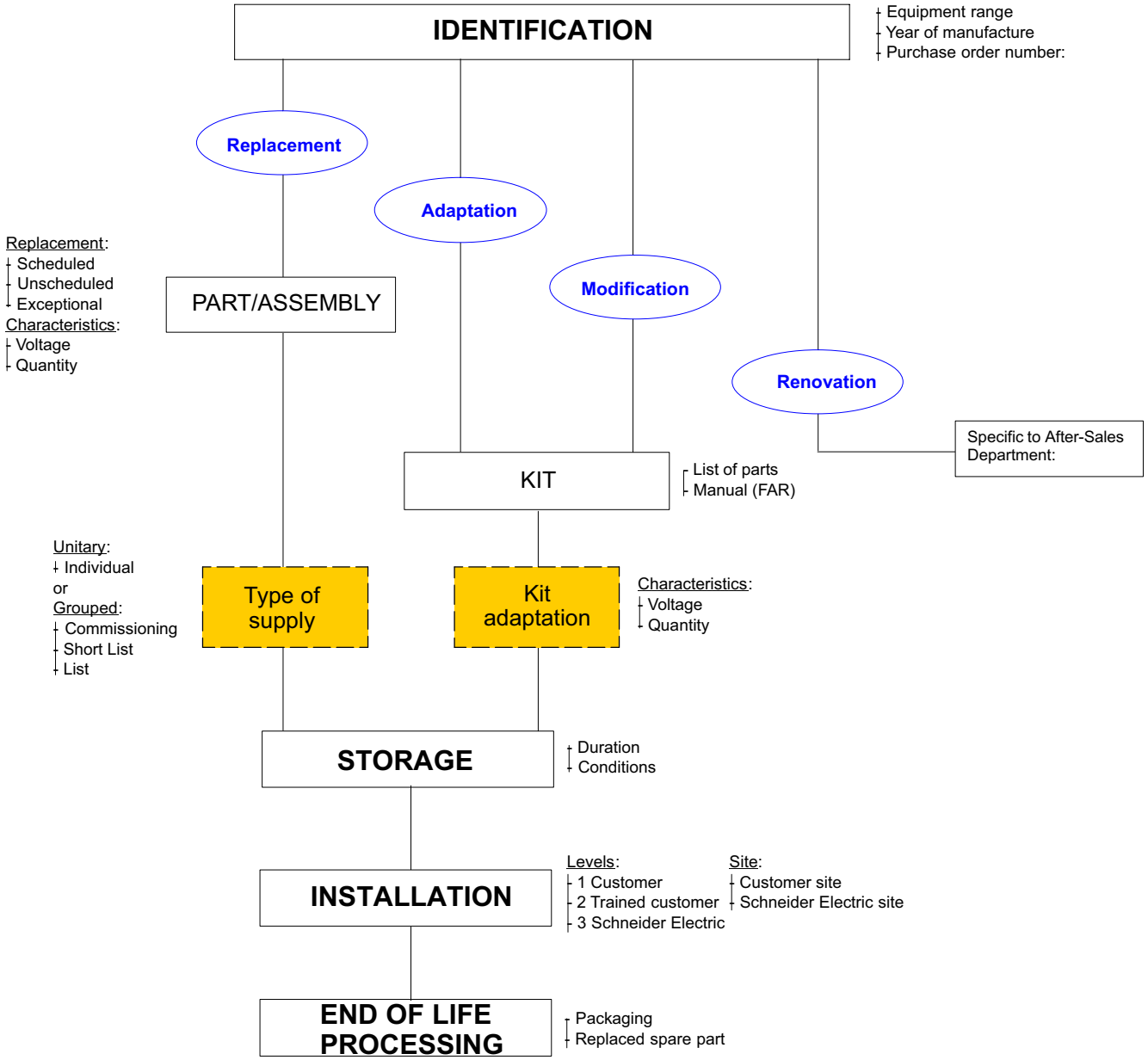
The components should be stored away from dust, humidity and the sun. In order to facilitate their retrieval, they must be marked by the Schneider Electric reference number.

Certain components are fragile, they should preferably be stored in their original factory packaging.

11.5 Presentation of the PAR

Intervention	What for?	Where?
Replacement	Standard exchange or part replacement	Customer site
Adaptation	Modification or installation of sub-assembly in kit format	Customer site
Modification	Modification, transformation or improvement often in an upgrade cycle	Customer site
Renovation	Technological upgrade requiring suitable knowledge and tools	Schneider Electric site

Illustrated example of PAR



11.6 Reuse or waste processing of replaced parts and packaging

NOTICE

Waste parts, sub-assemblies and packaging are to be removed through approved waste collection and processing channels.

12 Notes

If you have any comments on the use of this document or on the use of the equipment and services that are described in it, please send us your remarks, suggestions and wishes to:

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